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THE WORK OF THE ARCTIC EXPEDITION.

FORMERLY exploration in the Arctic Regions was entirely performed by ships. On one or two occasions only were sledge parties despatched for the purpose of discovery, and then on a very reduced scale. During the search expeditions, however, after Sir John Franklin and his gallant companions, the system of sledge travelling was matured, and has now, owing to the genius of M'Clintock, Mecham, Hamilton, Osborn, and Richards, reached a high state of perfection. In fact, in these days the sledge must be regarded as *the* principal means of Arctic exploration, and the ship only as the auxiliary. It is to Sir Edward Parry that the introduction of sledge travelling is due, but the very primitive and cumbrous machines used by him during his many successful voyages to the Arctic Regions, are no more to be compared with the light and useful sledges which are being constructed from the designs of Sir L. M'Clintock for the expedition of 1875, than is a brewer's dray to a light gig. We propose to institute a comparison between the modes of travelling past and present; and to describe the work that will fall to the lot of an exploring expedition during the space of twelve months. The best route for Polar exploration is the one that has been so unanimously advocated by all Arctic authorities both of our own and other countries, and the one that is to be adopted by the expedition about to leave our shores. There are many reasons why the route *viâ* Smith Sound is superior to and more advantageous for polar exploration than any other. We know that the United States exploring ship 'Polaris' succeeded by this route in reaching a very high northern latitude, —in fact, the highest latitude that a ship has ever attained, and that in a remarkably short space of time and with perfect ease. The shores of this narrow sound are teeming with animal life. In Dr. Hayes's expedition upwards of 200 reindeer were shot during the winter, walrus and seals were abundant, and there were quantities of ducks and little auks in the summer. Where the 'Polaris' wintered herds of musk oxen found pasture, rabbits abounded, and large flocks of birds came northward in the summer months. This in itself is of the utmost importance, as with well-organized hunting parties, such as will be formed on board our exploring ships, the crews will be supplied with fresh meat. The Smith Sound route is the best adapted for exploration by sledges, and in case of mishap or any unforeseen accident befalling the ships, it would simply be a matter of time for the ship's companies to travel south and reach the Danish settlements, or one of the Scotch whalers that annually frequent Baffin's Bay. The importance of reaching in the ships a high latitude lies in the consideration that every 10 miles made good in the ship towards the north, is two days' sledge travelling saved. The ships ought to leave England in the month of May or June. In a fortnight Cape Farewell, the south extreme of Greenland, would be reached, off which the first ice is invariably met. This in a great measure consists of small detached fragments, probably broken off the land-ice, with which Greenland at the early part of the year is surrounded, by the motion of the waves. Icebergs are also fallen in with in this locality. The scene on a fine clear day in Davis' Straits, to one visiting these regions for the first time, is indeed very grand. Huge icebergs sailing majestically along, in every conceivable shape and form, at times making the navigation so intricate as to call forth the utmost vigilance and watchfulness from those on board, their edges adorned with pendant fringes of icicles, whilst the bright blue and green tints reflected from these huge mountains of ice tend to render it a scene such as is hardly to be realised by those who have never witnessed it. The Danish settlement of Lievely, or Godhavn, at the south-west extreme of the island of Disco, and Upernavik, the most northern settlement, are reached, dogs are purchased and taken on board, Esquimaux dog-drivers engaged, and the necessary skins and dog food procured.

Now commences the first really serious work of the exploring ships. One day's run from Upernavik and Cape Shackleton is reached, from which is sighted the dreaded floe ice of Melville Bay, a spot which, until the introduction of steam, has proved fatal to many a gallant bark. To an inexperienced eye this ice seems of an impassable and impenetrable nature, but to those acquainted with ice navigation a lead may appear through which the ship is steered. Much depends on the wind in making a passage through Melville Bay. If it is calm, or if the wind is from the north, the ice loosens, and ships must then make the best of their time and push on speedily; but if the wind is from the south it causes the loose ice-floes of Baffin's Bay to pack against the land or fixed ice, and woe betide the unfortunate vessel that should be nipped between the two. The only means of escaping destruction is by cutting a dock in the land-ice and warping the ship into it. Steam, however, has of late years produced such a revolution in ice navigation, that the animated scene of 200 or 300 seamen landed on the floe, busily employed in the operation of cutting

docks, is now seldom or ever witnessed. The last English Government Expedition, that of Sir Edward Belcher, took no less than five weeks going through Melville Bay, although the expedition was accompanied by a couple of steam tenders, commanded by experienced and energetic officers. When Commander Markham went through Melville Bay in 1873, in the steam whaler 'Arctic,' the time occupied was only sixty hours, and last year the whole of the whaling fleet succeeded in making the passage in three days! Such is the advantage we have gained by the aid of steam. Detention in Melville Bay is, even with a steamer, probable, but seldom for a long duration. When such is the case, ice-anchors are got out, and the ship is moored to the floe, waiting an opportunity for the ice to ease off. Perhaps it is only a neck of ice that prevents the ship from proceeding; in which case, with a full head of steam, the objectionable barrier is rammed, and the ship is forced through, emerging into the open water beyond. Even during these detentions the time may be beguiled in shooting looms and rotges, which are capital eating, harpooning narwhals and stalking seals, or in the more exciting sport of bear hunting. Sport, together with the strange and novel scenery, and the beauties of the midnight sun, make life, even in Melville Bay, charming and enjoyable. In former days the monotony of the detention in this bay was indeed wearisome, and the laborious work of tracking the clumsy, unwieldy ship, or cutting docks in the floe, was fatiguing and irksome in the extreme.

In the latitude of Cape York the "North Water" is generally reached, and this, so far as we know, has always been navigable to the entrance of Smith's Sound, and to a much higher latitude.

We will now assume that the month of September has arrived, and that the expedition has succeeded in reaching, we will say by way of illustration, the latitude of 84°. We are, of course, anticipating an open season, and a most favourable and prosperous run. Bay or pancake ice, which is newly-formed ice, is now forming, and it is absolutely necessary to seek winter quarters. A snug harbour is, if possible, found, protected as much as possible from the prevailing N.E. winds, and arrangements are at once commenced for securing and housing-in the ship. One part of the ship's company is told off for this latter duty, which consists in unbending the sails, unreeving running rigging, sending down upper spars, and housing the ship in with a covering made of tilt cloth. This is spread on spars that are secured fore and aft between the masts about 15 feet above the deck, sloping down to the bows and the stern, and ridge-ropes set up to the rigging, about 7 feet above the bulwarks. One entry only is made as a gangway, on what would be the lee side of the prevailing wind. An observatory is built, and an ice wall made to enclose the ship, the space inside the wall being kept free and clear, to be used for exercise, and as a promenade during the winter months. In the meantime, the other part of the ship's company will be preparing the sledges, and making the necessary preparations for the autumn sledge travelling, all of which will have been carefully organized beforehand.

We now come to the most important feature of Arctic work, namely, the sledge travelling, which was first ntroduced by the late Admiral Sir Edward Parry, but which is most indissolubly associated with the name of M'Clintock, whose perseverance and energy have brought this system of travelling to such a state of perfection that we rely chiefly on its aid to procure for the forthcoming expedition that success which all England heartily and eagerly desires, and hopefully anticipates. Before describing the arrangements for the autumn travelling, let us take a brief retrospect of the sledging undertaken by Parry fifty-five years ago.

Parry at Melville Island, in 1820, did not commence travelling operations until June. He used a cart, in all probability formed of the field-piece carriage and limber supplied to the ship. He was away only fourteen days, having traversed a distance of about 180 miles, averaging 12' per diem. His party consisted of twelve, including himself, out of which five were officers. On account of the excessive glare caused by the sun on the snow and ice, the party travelled during the night, when the sun was low. By this arrangement they had the advantage also of sleeping during the comparative warmth of the day. The daily allowance of provisions per man was 1 lb. of biscuit, $\frac{2}{3}$ lb. of preserved meat, 1 oz. of sugar, and $\frac{1}{2}$ pint of spirits. The total weight carried on the cart was 800 lbs., consisting of two blanket tents, wood for fuel, three weeks' provisions, cooking apparatus, three guns, and ammunition. In addition to this, each man had to carry a blanket-bag, a haversack with one pair of shoes, one pair of stockings, and a flannel shirt, weighing from 18 to 24 lbs. Their tents were made of blankets, with two boarding pikes fixed across at each end, and a ridge-rope along the top, the lower parts of the blankets being kept down by placing stones on them.

In his attempt to reach the Pole, in 1827, Parry started in the same month of June, with four officers and twenty-four men, with seventy-one days' provisions, in two flat-bottomed boats named the 'Enterprise' and 'Endeavour,' so constructed that they could be used as sledges, and drawn on the ice. They were 20 feet long, and 7 feet broad, with a bamboo mast 19 feet long, a tanned duck-sail, steer-oar, fourteen paddles, a sprit and boat-hook. Each boat with stores, &c., complete, weighed 3753 lbs., making the weight for each man to drag 268 lbs.! in addition to four light sledges, weighing 26 lbs. each. The boats were squarely built, without regard to shape or symmetry, their beam carried well forward and aft. In order to secure elasticity during the rough handling which they must needs encounter from frequent concussions with the ice, their frame was first covered with a waterproof coating, consisting of tarred canvas, then a thin fir planking, which latter was covered with felt, and outside a thin oak planking, the whole secured to the timbers of the boat by iron screws. On either side of the keel was a stout wooden runner, shod with metal, similar to that of a sledge, on which the boat would travel when being dragged over the ice. A spar, made of hide, was secured across the fore end of the runners, to which the drag-ropes were attached. The daily allowance of provisions for each man was 10 oz. of biscuit, 9 oz. of pemmican, 1 oz. of cocoa-powder, and 1 gill of rum, besides 3 oz. of tobacco per man per week. The fuel used was spirits of wine, of which 2 pints were used daily.

This was one of the most laborious and heart-breaking journeys that can be conceived, as owing to

the lateness of the season, the travelling was chiefly over loose pack, which on account of unusual heavy rain was broken and rotten; added to this, the hummocky nature of the firmer ice necessitated a constant packing and unpacking of their sledges, the same ground having to be traversed as many as three and sometimes four times. Parry nobly persevered, fighting against obstacles that would have daunted and appalled many a brave man, until it was known that the drift of the ice on which they were travelling was faster to the southward than the progress they were making to the northward, and they were in consequence reluctantly compelled to abandon their project and return to their ship, which they succeeded in reaching after an absence of sixty-one days. Although before turning back the party had travelled over 292 miles of ground, their greatest distance from the ship was only 172 miles, so much had the set drifted them to the southward. Notwithstanding these obstacles, and the enormous weight which each man had to drag, the latitude attained by Parry on this occasion has never been reached by known man. The experience gained during this enterprise has shown us a great deal. It proved that the allowance of provisions for the amount of work required, and for the hardships endured was insufficient. That the sledges were too cumbrous and heavy, and the weight that each man was required to drag was far in excess of their capabilities, and that the season was so far advanced as to cause not only the ice to be broken up, and thereby affected by the current, but the mild temperature had so rotted and thawed the surface of the floes on which they travelled, that the greater part of their journey was performed walking through sludge and water. As during his former sledge journey in 1820, Parry preferred travelling by night, and resting during the glare and warmth of the midday sun.

The next authentic accounts of sledge travelling we hear of are those parties organised by Sir James Ross in 1849 for the relief of Sir John Franklin, in which Sir Leopold M'Clintock, then a lieutenant, received his first initiation in that important branch of Arctic work, which through his means has reached such an admirable state of perfection. But to what consequences did these pioneer expeditions lead? Experience had to be gained, and the privations and sufferings endured by those engaged in these early expeditions are now compensated by the lessons they have taught us. They started with two sledges, each drawn by six men, carrying with them their tent and thirty days' provisions. Other parties with more provisions followed on their route. They were away forty days, having accomplished a search over 500 miles of unknown country, but we are told that out of the twelve men that started, seven only returned in comparative health, the remaining five having quite broken down under fatigue. The party suffered severely from hunger, frost-bites, blistered feet, and rheumatic pains, caused by their continually walking through water on the ice and deep soft snow. Two of them, being unable to walk, were brought back on the sledges. Sir Leopold himself acknowledges that after his return to the ship, he did not lose the sensation of *constant hunger* for nearly a fortnight.

During the next expedition, that of Captain Austin, in 1851, from the experience which he had already gained in sledge travelling, Sir Leopold M'Clintock, by adopting a system of fatigue parties, was enabled to prolong his absence from the ship to eighty days, and to extend his journey to a distance of 900 miles. During this journey, partly travelling over the same ground as Sir Edward Parry, he discovered the encampment of his predecessor, and found the remains of his broken cart, and the records left by him thirty years before. Even the remains of Parry's last feast, "a sumptuous meal of ptarmigan," lay strewed about in the shape of bones, by no means decayed, but merely bleached from exposure. M'Clintock and his gallant party returned to their ship after this long absence, reduced a little in flesh, but *not* in health or spirits. They had already benefitted from the experience of former expeditions.

During the expedition of 1852, the last despatched by Government in search of our missing countrymen, we find Sir Leopold M'Clintock in command of the steam-tender 'Intrepid,' acting under the orders of Captain Kellett. On this occasion, Sir Leopold had, through the assiduous and constant exercise of his inventive talent, so improved on his former knowledge of sledge travelling, that he was enabled to remain away from his ship for a period of 105 days, during which time he travelled over no less than 1400 statute miles, and this, too, under no very favourable circumstances, as the ice over which he had to journey was old and unusually rugged, snow lay very deep, and Melville Island had to be crossed and recrossed, in addition to which, owing to the few men from which he had to select his party, he was obliged to portion out to each man a much heavier load than had ever been attempted before. They were most fortunate in obtaining plenty of game. Musk oxen, deer and ptarmigan were seen in abundance, and many shot, the fresh meat from which materially assisted in the preservation of the health of the party.

The words of Sir Leopold M'Clintock are very true, and very significant, in epitomizing the results of Arctic ice travel. He says:—"Truly may we Arctic explorers exclaim—'Knowledge is power!' It is now a comparatively easy matter to start with six or eight men, and a sledge laden with six or seven weeks' provisions, and to travel some 600 miles across desert wastes, and frozen seas, from which no sustenance can be obtained. There is *now* no known position, however remote, that a well-equipped crew could not effect their escape from by their own unaided efforts. We *felt* this, and by our experience, gained in a cause more glorious than ever man embarked in, have secured to all future Arctic explorers a plan by which they may rejoin their fellow men."

Before detailing the operations connected with the autumn sledge travelling, it will be necessary to explain the construction of the sledge, and the amount of provisions and stores that will be required for an extended journey. We propose, therefore, to give an account of an eight-man sledge, provisioned and stored for a period of eight weeks, copied from Sir Leopold M'Clintock's notes. The following particulars describe, with considerable exactness, the equipment which is now being prepared in Portsmouth Dockyard for use in the forthcoming Arctic Expedition:—

The sledges are made of American elm, and the runners are shod with steel. The cross-bars are lashed to the bearers with strips of hide, which are well

soaked in hot water and put on whilst warm and wet, so that when cold they will shrink tightly into their places.

The drag-ropes should be of 2-inch whale-line, or better still of hemp or manilla rope, which is lighter, six fathoms in length, and these could also be used for tent-ropes. They should be middled and the bight toggled to the span on the fore end of the sledge. The span should be of the same size and description of rope, fitted to go with an eye over the end of the horn at the after-end of the sledge, rove through one or more grummets on the cross-bars, through a hide-strop round the runner, and taken well down below the foremost horns, so as to keep it as near as possible to the best angle of traction, namely 15°. The bight of the span should be about 3 feet in front of the sledge, having a toggle and eye in the middle for the purpose of connecting the drag-ropes. To keep the contents from falling down between the cross-bars, two fore and aft lines are clove hitched round each and stretched taut along—over these is laced a width of stout canvas, on which rests the sledge trough or load, and is called the sledge bottom. The sledge trough, although not absolutely necessary, is extremely useful, as it enables the sledge to be loaded more speedily, and prevents small packages from tumbling out; it is also most useful in the event of much wet. It is simply a canvas body in which the stores are packed, and weighs, without being oiled, 8 lbs.

The drag-belts are made of light loose girth, 3 inches wide, long enough to go over a man's shoulder, having a strong eyelet-hole worked in each end, into which is spliced a piece of 1-inch rope, having a thimble on it. Round this thimble is spliced a small piece of rope, having at its other end a bung toggle, usually a circular piece of copper. This is attached to the drag-rope after the manner of a Blackwall hitch, the advantage being that the man can detach himself at any instant. Turk's-heads worked on the drag-ropes point out where the men are to attach themselves. The sledge lashings consist of about 20 fathoms of $1\frac{1}{4}$-inch untarred rope, and is used for lashing the lading on the sledge.

Too much care cannot be taken in the stowage and lashing of the sledge. The greatest weight should be over the centre cross-bar, diminishing towards the end, so that the sledge will rise easily and gradually, and descend in the same manner, when travelling over rough or hummocky ice. A well packed, that is, a well-trimmed sledge is dragged with less exertion, and less jerking to the men's shoulders, when going over rough ice, than one that has been carelessly packed. The lashings should be passed so tight that, should the sledge be upset and roll over, its contents would remain intact. It will be found convenient to fit a light cross-bar across each end of the sledge, for the purpose of spreading a light netting, on which to stand the cooking utensils, as they are usually the last things to go on the sledge, and the first things to come off it.

Dog-sledges are of a smaller size, and the different fittings and gear are therefore proportionately small. The driver in a packed sledge usually walks behind, holding on to the back of the sledge with one hand whilst with the other he uses the whip, which latter has to be kept in constant use.

A most important auxiliary in sledge travelling, and one which must not be omitted, is the sledge sail; by its aid, with a fair wind, the men are greatly relieved in their laborious work of dragging. The mast is extemporised out of two tent-poles—which should, if possible, be of bamboo—used as sheers, the heads being connected by an iron band, on which is stropped the block through which the halliards are rove; the heels of the sheers are stepped into a thimble on each side of the sailing thwart, which is placed across the sledge on top of everything, immediately over the midship upright, and is lashed down to the bearers. The object of having it so high is that a loftier sail may be spread. The tent-ropes are used as guys, and a hand lead-line as halliards.

Each sledge should have what is called a "store-bag," made of light duck, and containing sail and sewing needles, a palm, twine, thread, a ball of spun-yarn, 2 yards of green or blue crape, awls, waxed ends, lucifer matches, record cases, tent brush, clothes brush, and spare wicks for cooking-lamps.

With an eight-man sledge detached for an extended journey of seven weeks the total weight of the laden sledge would be 1646 lbs., being 235 lbs. for each of the seven men to drag. If *all* the circumstances are favourable, Sir Leopold M'Clintock is of opinion that this is not too much; of course the men must be picked and well trained to sledge-work before setting out. Under no circumstances should this weight be exceeded, or even maintained for more than a very few days. When sledges are travelling in company, one gun each and much less ammunition will suffice. The sledges being prepared and everything in readiness for a start, the men are assembled dressed in the following manner:—

	Spare.
1 Flannel or wove woollen frock.	
1 Thick Guernsey frock.	
1 Loose serge or cloth frock	1
1 Pair of good duffle (or box cloth lined with flannel) trowsers.	
1 Light close duck jumper and trowsers as "overalls."	
1 Pair of worsted stockings	1
1 Pair of wove woollen drawers	1
1 Pair of blanket feet wrappers	2
1 Pair of wadmill boot hose	1
1 Pair of mocassins	3
1 Pair of mitts	2
1 Welsh wig	1
1 Cap, veil and face cover.	
1 Comforter.	
1 Pair of coloured spectacles.	
1 Pair of canvas boots	2

Towel and soap, also a water-bottle and gutta-percha drinking-cup. Spare clothing in knapsack, altogether weighing 12 lbs.

The clothing supplied by Government to the various search expeditions was made of the most superior material, and was found excellent. It is hardly necessary to describe the different articles. Particular care should be exercised in the selection of underclothing which should be of the best and warmest substance. Outside clothing should fit loosely. In place of the overall jumper and trowsers, which are used merely as "snow repellers" to keep out the light snow-drift, a suit made from the skin of the moose-deer well smoked would be found advantageous; the jumper should have a hood to pull up over one's cap in bad weather, and should have a large pocket in front to put one's mitts in when not in use. The mocassins should be made large, so as on no account to cramp

the foot. They are only intended to be worn during extreme cold.

The daily allowance of provisions for those engaged in sledge travelling is as follows:—For each man, 1 lb. pemmican, ¼ lb. boiled pork, 14 ozs. biscuit, 2 ozs. preserved potatoes, 1½ oz. prepared chocolate, ½ oz. tea and sugar, 1 oz. concentrated rum; 4 ozs. fuel being used daily for each individual; also a weekly allowance per man of 1¾ oz. salt, ¼ oz. pepper, 1 oz. curry or onion powder, and 3 ozs. tobacco, making a weekly allowance per man of 19 lbs. 3 ozs., which is a very liberal one, and well adapted to long journeys in the most severe weather. In fact, at first starting, the men are not able to consume the full amount allowed of pemmican, but after a few days' hard work and exposure this little difficulty is soon overcome. Fuel may consist of different materials. There is the camphorated spirits of wine, whose great charm consists in its being camphorated, and, therefore, cannot well be tampered with by the men. Methylated spirits of wine has also been much used, and is cheaper than pure alcohol. Sir Leopold M'Clintock, in the 'Fox,' used crude cocoa-nut oil, which he found very useful and very cheap. Its advantages over tallow are—1st. That it cooks much more rapidly; 2nd. It makes very little smoke (an important item); and 3rd. There is nothing disagreeable in smell or taste about it.

Great care must be taken in the stowage of provisions, and, in fact, in all that relates to the equipment of a sledge, as it is most important that the greatest economy in the matter of weights should be arrived at. The officer conducting the sledge party is, of course, responsible that the necessary instruments are taken that will be required for fixing astronomically different positions, and for delineating the coast line. Everything being in readiness for a start, the sledges, which we will say are six in number, with their distinguishing flags (to each of which there is usually a history attached) fluttering bravely in the breeze, are drawn up outside the ship, the men, cheerful and joyous, with their drag-ropes in hand, the officers with their rifles slung across their shoulders, receiving their parting instructions, all hopefully confident of success, and all eager to accomplish all that man can do. It is an animated scene, all are merry and glad, with the exception, perhaps, of those few that must of necessity remain behind, to look after the ship. The crews of each sledge consist of an officer and seven men, and by a system which has already been adopted with great success on previous occasions, one sledge could be advanced to at least fifty days' journey from the ship, or more correctly twenty-five days out, and depôts placed for the return journey. This is effected in the following manner:—After travelling in company for a week, No. 6 sledge will complete the remainder to their full amount of fifty days' provisions and return, the remaining five proceeding on their way. When six more days have elapsed, No. 5 sledge will return to the ship, having filled up the remaining four to what they originally started with, and so on until No. 1 sledge is left to proceed by itself. In the meantime the sledges that have returned will immediately re-provision, and will lay out depôts for the use of, and meet the returning sledges, ready to render any assistance they may require.

As an outline of the daily routine observed by sledge parties during their arduous employment may be of interest, we will briefly refer to it. As it may be advisable some time to travel during the night, for the same reason that Parry did, we will not name any hour, but merely the time of rising and going to bed. We will begin with the commencement of the day's work. The first thing to be done is to awaken the cook of the day, who at once sets to work to prepare breakfast. The time occupied in preparing this meal is usually about an hour from the time he is called. When nearly ready, he brushes off the condensation that has taken place during the night, from off the coverlet, and from the inside of the tent, and then arouses the whole party. If the weather is very severe they sit up for breakfast in their bags, but if not, they roll them up, as also the tent robes, put on their mocassins, &c., ready for the march, and then, sitting on their bags and knapsacks, discuss their morning meal. The sleeping-bag is, as its name designates, a large bag made of the Hudson's Bay 3-point blanket or of duffle. It is about 7 feet long, and is best fitted with the opening in the side instead of at the top, as in this way it is more convenient to get into and out of, and the more readily enables a man to sit up and keep it over his head whilst eating his meals or whilst writing.

When breakfast is finished, the biscuit and pork to be used for lunch should be measured out, and placed in the luncheon haversack; dilute the day's allowance of rum, and any water that may be remaining put into the men's water bottles. Issue to the cook the day's allowance of stearine, and put the requisite amount of spirits of wine into the lamp. The cook trims both lamps, and is then relieved by the cook whose turn it is for the next twenty-four hours. In large parties it would be as well to have a cook's mate in addition, who would succeed the cook when his term of office had expired, a fresh hand being installed in the capacity of cook's mate. The whole of the tent furniture must be well brushed, so as to get rid of any snow drift, or condensation, and the tent itself should be well shaken before being stowed on the sledge, which is then packed, and the march begun. The officer takes his observations for time or variation, also the bearings of land, temperature, &c., at a regular time before starting.

After marching for about six hours, halt for twenty minutes for lunch. The spirit lamp is used to dissolve snow, and the grog, pork, and biscuit are issued. If the wind is fresh, turn the sledge at right angles to it, and with sledge sail to form a lee sit down. If very severe weather pitch the tent, and sit inside without any tent gear, or stop only five minutes for grog and biscuit. When halted for the night, and the tent is pitched, one man, after brushing himself well, goes inside, and receives and places all the gear, robes, knapsacks, sleeping bags, &c. The cook prepares supper without delay. When all the work is completed the men take off and hang up their mocassins or boots and blanket wrappers, either upon the tent ropes outside, or on the tent line inside, according to the weather, brush themselves well, divest themselves of their overalls, and take up their respective places in the tent, the officer always at the head of the tent, the cook and cook's mate nearest the entrance, so that their rising does not disturb the rest.

Supper consists of warm pemmican, the quantity in each pannikin always being carefully equalised, before being served out, then a drink of tea or water, when pipes are lighted and the party compose themselves for their night's rest; songs and yarns, if not too cold and exhausted, bringing the day's proceedings to a close. The officer, as a rule, takes his observations whilst supper is being prepared, and before lying down winds up his chronometer and writes his journal. A very good rule is to give directions, for precaution's sake, that the tent robe is never to be spread until the question has been asked, "Has the chronometer been wound up?" Before retiring, the cook sees everything in readiness for the morrow's breakfast; the captain of the sledge serves out the breakfast allowance to him, and sees everything connected with the sledge secure and safe.

The tent is made of light, close, unbleached duck, weighing 12 square feet to the lb., lined with brown holland across the head, or end opposite the door, up to a height of 3 feet, and along the sides to a height of 2 feet. It is spread by means of tent poles, two (crossed) at each end, and set up with tent ropes or guys. A window, 6 inches square, is fitted at the upper end with a flap to trice up or haul down. There should also be a pocket at this end for the use of the officer, in which instruments, &c., might be placed. A cook's pocket at the opposite or door end of the tent is also convenient. In *very* severe weather the cooking has sometimes to be performed inside the doorway; it is, however, very objectionable, and should not be practised more than is absolutely necessary, as the steam condensing covers everything near it with fine particles of frozen vapour, and the soot from the stearine lamp blackens everything. The furniture for a tent consists first of a waterproof floorcloth, made of a light description of mackintosh; this should be used with care, and only over snow. The coverlet should be made of the Hudson's Bay 3-point blanket or thick duffle, its upper side covered with glazed brown holland. Three stops should be sewn on one end of this coverlet, for tying it when rolled up, and when in use for tying it to the lower robe at the upper end or head of the tent. The knapsack forms the pillow.

The canvas floorcloth, though not absolutely indispensable, is, however, very useful. It is made of very light unbleached duck, and is also used as the sledge sail, which is only set when the wind is abaft the beam. It should be laid down over the waterproof floorcloth, when the men are taking off their boots and taking their suppers. In severe weather, when the breath condenses in the tent and falls in minute frozen particles, the canvas floorcloth is useful to spread "over all" after the men have laid down, as it catches all this fine snow, which would otherwise penetrate into the coverlet, where it would thaw by the heat from the men's bodies, and be frozen into them again when exposed to the air. "So rapidly," says Sir Leopold M'Clintock, "does frost accumulate, that in eighteen days of travelling during the month of October, I have known the coverlet and the lower robe to become more than double their original weight."

The lower robe or blanket should be of the same material as the coverlet, namely 3-point Hudson's Bay blanket or thick duffle. It should have a covering of brown holland on its underneath side, having stops on its upper side to tie to similar stops on the coverlet when spread for the night: probable weight of the lower robe about 17 lbs. This robe has sometimes been of fur, but it has its disadvantages, as in the first place it is more absorbent; a skin will when wet emit a disagreeable smell; the hairs come out, and they shrink very much; they are also more stiff and unmanageable when frozen. The above mentioned woollen materials are on the whole preferable, as they are quite as warm as fur, when covered with the brown holland, in addition to which evaporation from the body will generally make its way through woollens, and escape into the air, but in the fur robe is arrested and condenses in it. The coverlet, lower robe, and sleeping-bag answer well when the temperature is no lower than $-30°$, but should it fall lower, an additional coverlet should be supplied, as well as a small blanket bag to put into the sleeping bag to keep the feet warm. Should the temperature continue to fall, snow huts should be used, they being very much better and warmer than tents. A party of four men can, after a little practice, hut themselves in about half an hour; one man cuts the blocks, another builds, and the other two carry the blocks and fill up chinks, &c.

Building a hut with a large party, however, is a different matter, the difficulty in constructing the dome greatly increasing as its diameter is enlarged. It then becomes a question whether it would not be more advisable to build two huts, and to divide the tent robes, &c., between them, or to build four walls enclosing a space of about $6\frac{1}{2}$ feet wide, and long enough to accommodate the whole party (14 inches being the allotted space of each man). The tent is then used as a roof, by being laid over the walls, and snow thrown on it to prevent the wind blowing it off. The walls should incline inwards slightly, and be about 5 feet high, and the floor excavated to a foot or so to give additional height inside. The advantages a snow hut has over a tent-roofed house, is that should the temperature become high, the moisture overhead runs down the walls in the former, whereas in the latter it drips, and makes the tent so wet that when it freezes again it is almost impossible to spread it. The snow hut which Englishmen should construct (that is, without the aid of the Esquimaux) is made of slabs of caked snow about 2 feet long, 1 wide, and 6 inches thick. The site (a circle) is first marked out on the snow, and beginning with a very narrow slab, inclining slightly inwards, the building is commenced and continued spirally, until at a height of about 5 feet, when a single rounded slab is cut, closing up the centre of the dome. The entrance is as low as possible, and is cut the last thing by the man inside. When the temperature is low it will be found preferable to encamp on snow rather than on land, and still warmer upon ice when there is water underneath, which will materially add to the warmth and comfort of the encampment.

Whilst dragging the sledges it is very necessary to keep continually changing the leading men on the drag-ropes, as on them rests the severe task of exerting their eyes in order to pick their road, and they are therefore more subject to snow blindness than the others. The officer, when not engaged in dragging the sledge, should be very particular in selecting a good and easy line of country; this is of the utmost importance.

We will now suppose that the season for sledge travelling has passed, the sun no longer sinks below

the horizon, the object for which the sledge parties have been striving has been gained, and they have all returned to their ship, which they left three months before frozen up in the solitude of their winter quarters. Some, which have returned early, after taking out depôts for the extended parties, have since been actively engaged on regularly organised shooting excursions. But all are back by July. They return to a busy scene. Active preparations are being made to get the ship ready for sea. The housing is taken down and stowed away below, and it is to be hoped will not again be seen, as rumour whispers they are homeward bound; spars are swayed up and sails bent and the ship is again "all a taunto," and all are anxious once more to feel the long roll of the ocean. The open water is seen to the southward from the crow's-nest, but it is some distance off, and the ship is held fast in the wintry grasp of the ice. The month of June has come and gone, July is nearly at an end, if they are not shortly released they will perhaps be doomed to spend another winter in that inhospitable and inclement region. During the preceding months those on board have not been idle, as a long line of ashes, sand, and rubbish of all descriptions, thinly sprinkled from the ship's bows in a long straight line to the southward, will testify. This has been done with the object of penetrating and rotting the ice, the dark colour attracting the heat of sun, so as to make a passage for the ship to pass through. This device has failed and others must be resorted to to effect their liberation.

Blasting has been determined upon. Charges of 3 lbs., 5 lbs., and 10 lbs. of ordinary gunpowder will be prepared for use, in tin canisters, with Bickford's fuze. If, however, the new explosive "cotton gunpowder" should be the substance selected to carry out this object, a small charge of about 2 lbs. is prepared, primed with its detonator, to which is attached a short length of Bickford's fuze. Operations are commenced from the open water and carried on towards the ship. A hole is made in the ice by means of a drill some distance from its edge, and the charge is lowered down through this until it reaches the water and is placed immediately under the ice. The fuze is ignited, a sharp explosion takes place, and the ice is shattered and rent in all directions. Men in boats, and others armed with boat-hooks and long poles, at once assail the fragments, removing them from the channel into the open water. These operations are repeated until a clear channel has been made, through which the ship is able to steam and thus effect her escape. The advantages which the "cotton gunpowder" has over ordinary black gunpowder are numerous. It is a much more powerful explosive, its proportionate strength to common powder being as eight to one, but its great merit is said to consist in its perfect safety. If put into the fire it will burn quietly without any explosion, nor will it explode on concussion.

The practice of ice-blasting is not a new invention, and had been much resorted to by the various search expeditions. Their plan was simply to lower a glass bottle, or preserved meat tin, containing from 2 to 4 pounds of ordinary gunpowder below the ice and explode it. The results were most satisfactory. Lieutenant Mecham tells us that during Captain Austin's expedition, in 1851, a blasting party was employed for twelve days in detaching a floe from the eastern shore of Griffith Island. With 216 pounds of powder they cleared away a space 20,000 yards in length, and averaging 400 yards in breadth; this ice varied from 3 to 5 feet in thickness. The estimated weight of the ice removed was about 216,168 tons. The heaviest charge used on this occasion was 16 lbs. lowered 10 feet below 5 feet ice; its effect was the breaking up of a space of 400 yards square, besides splitting the ice in several directions. The last charge would be equivalent to 2 lbs. of "cotton gunpowder," but the results with the latter explosive would, in all probability, be far more effective.

The work of an exploring expedition in the Arctic Regions for the period of twelve months has now been detailed. No unforeseen accident, no detention in the ice, in fact no casualty of any description has been taken into consideration, but everything has progressed under the most exceptionally favourable circumstances. That the same will be the case with the Arctic Expedition of 1875 is too much to expect, but that it will be successful in exploring a large area of unknown land may be confidently hoped and anticipated.

CAMERON'S VOYAGE ROUND LAKE TANGANYIKA, AND THE DISCOVERY OF THE LUKUGA OUTLET.

EARLY in March, 1874, Lieutenant Cameron completed his preparations for surveying the southern or unknown half of Lake Tanganyika. He hired two boats, which he named the 'Betsy' and the 'Pickle,' the latter as a tender. For the 'Betsy' he made a sail, and also rigged a waggon roof awning in the stern. He marked a lead-line for soundings up to 65 fathoms, and, having hired two guides, he started from Ujiji on the 13th of March.

The first difficulty arose on the 18th, owing to the belief of the crews in some sort of devil at the Kabogo Point, to which they offered up a quantity of beads from the bows of the boats. The point is a double one, the second being called the devil's wife. The timid boatmen caused much delay, through their habit of coasting round every little bay and indentation, instead of going direct from point to point. The shore consisted of low wooded hills coming right down to the water, with landslips showing red patches. On the 23rd Ras Kungwe was rounded. The encampment that night was near the village Kinyori, where Cameron witnessed a native dance. The country, on the east coast, is very hilly, the ground rising 800 to 1000 feet above the lake, and the highest point, at Kungwe, being 1500 feet high. On the 28th, Cameron, after pulling and hauling through a canal much choked with reeds, for half an hour, reached a populous village called Karyan. The people have cattle and abundant supplies of provisions, and trade in ivory and slaves. Their spears are very long, with blades 20 inches by 2 inches, and the hafts grooved so as to give a good grip. The clothing, which admits of a fresh suit every day, consists of a bunch of grass in front and another behind, making them look exactly as if they had tails.

On the 30th of March the voyage was resumed, rounding Cape Makangazi, and on the 3rd the boats

rounded the point at the mouth of the river Kifisia. Here the land becomes low, and the hills recede from the shore. The coast is being washed away, and at the river Musamwira there is a long spit with patches of grass, forming a sort of marshy island with shoal water extending far out, which was all land a few years ago. The Musamwira is the drain of the Likwa into the lake, and where the spit and shoal now are there was once a large village. A strong current was here setting W.N.W.

As regards this eastern shore, the southern limit of the Ujiji district is the Ruche River. Thence to Malagarazi is Ukaranga. Then Kowendi extends from the Malagarazi to the Musamwira. Ufipa stretches from the Musamwira to the south end of the lake, and then come Ulungu and Marungu.

On the 7th the boats were off the Mpimbwe Promontory, composed of enormous blocks of granite; on the 8th they passed Ras Kambembe and Ras Kalanki; and on the 9th, sailing past the Makakamo Islands, which are said to have been part of the mainland within the memory of man, they encamped at a place called Kilata. The next places of importance are a village on the Kowenga rocks, and the river and village of Makukiva, with a stockade and ditch. Here the lake is only 10 or 12 miles across; and the land at the south end is visible. In this district much cotton is grown and manufactured. "On the outside of Pulungu Island the rocks were in enormous masses, piled up in vast overhanging blocks, the whole overgrown with trees jutting out from every crevice, whence hang green creepers 50 or 60 feet long, and through these fringes a glimpse may be caught here and there of hollows and caves. The scenery seemed like some grand transformation in a pantomime, and one almost expected to see the rocks open and sprites and fairies come out. All is silence; but suddenly, as one pauses to gaze on the marvellous landscape, the long creepers begin to move, and a troop of monkeys, swinging themselves along, appears upon the scene. They stop and hang by one paw, chatting and gibbering at the strange sight of a boat. A shout—and they are gone."

On April 17th Cameron reached the south end of the lake, where there is a river called Kirumbwe. He was not able to obtain sights, but his dead reckoning, day by day, was calculated with great care, and immediately plotted on a chart on a scale of 5 miles to the inch.

On the 18th the boats came to Kasangalowa, where palm-oil trees were seen for the first time since leaving Ujiji. Here the men all carry bows and arrows, and short spears, a knobstick, and shield of skin. These Watuta were friendly. They live by the chase. At one of the villages, called Kisunge, Cameron was much interested in watching a potter at her work. First she pounded enough clay and water for one pot, with a pestle, till it formed a perfect homogeneous mass; she then put it on a flat stone, and gave it a dab with her fist in the middle to form a hollow, roughly worked it into shape with her hands, keeping them constantly wet, and then smoothed out the finger marks with a corn cob, and finally polished the clay over with a piece of flat wood, and a bit of gourd which gave it the proper curves. Finally, she traced an ornamental pattern, with a fine pointed stick. It had no bottom, but after it had been drying for five or six hours, in a shady place, a bottom was worked in from another piece of clay. These pots hold about three gallons, and the shapes are very graceful, like the amphora in the Villa Diomede at Pompeii.

On the 21st they came to Akalunga. Here the granaries are built on posts, with circular floors, raised 3 feet from the ground, and 12 feet in diameter. Some of the largest are 20 feet high, exclusive of the conical roof. The sides for granaries containing old corn are plastered over, with a small hole under the eaves for access. Those for young corn are made of canes hooped together, and admitting the air freely, to prevent heating.

Here numerous little streams and torrents were pouring into the lake, and Cameron thought that there were also springs in the bed, for in several places where landslips had occurred, the water was bursting out between the stones, and trickling down into the lake. The country seemed like a great sponge full of water.

The districts on the west side of the lake, commencing from Marungu, are Utembwe, Uguhha, Ugoma, and Uvira. At the north end is Uzigi, between which and Ujiji the district of Urundi intervenes.

On April 24th the boats passed Runangwe on the west coast. Here there were very high rocky hills covered with trees to their summits, and a couple of *soko* (chimpanzee) were seen amongst the rocks. At this point is the Runangwa (the Marungu of Burton), which is in reality 80 miles from the south end of the lake. On the 26th much cultivation was seen, and small villages without stockades, a sign of more peaceful times. There was a fresh breeze, and Cameron took in a reef by twisting the tack of the sail into a rope for a couple of feet and lashing it. The wind was aft, and a pretty good sea was running, so a second reef was managed by putting a lashing round the after yard-arm.

On the 30th, when the boats passed Tembwe, it was a dead calm; and soon afterwards the mountains near the lake rise to a height of 2500 feet. This is the Uguhha country. On May the 3rd Cameron made sail to a slashing breeze, freshening up from the eastward, rounded Ras Kampumba, and at 11.40 A.M. the boats entered the river Lukuga, the outlet of Lake Tanganyika.

The chief came on board and reported that the Lukuga flowed into the Lualaba, but that the navigation was difficult owing to the quantity of obstructing vegetation. No Arab had ever been down it. On the 4th Cameron went 4 miles down the river, which he found to be 500 to 600 yards wide and 3 to 5 fathoms deep. At the furthest point he was stopped by grass, but found that a way could be cut for small canoes. There is a bar at the entrance of the outlet, caused by the washing away of the shores as the stream flows out. The width at the entrance is 1·5 mile, but most of this was a grass-grown sand-bank, leaving only a small entrance at the southern end, where there is a bar on which the surf breaks heavily at times. The least water on the bar is 1½ fathom, while inside 3 to 5 fathoms were obtained. There were 3 fathoms close to the grass which barred the progress of the boat 4 miles up the river. The taste of the Lukuga water is the same as that of Tanganyika, which is

Map of the Southern TANGANYIKA,

from a Sketch Survey by

Lieut. V. LOVETT CAMERON, R. N.

Scale. 1:1,000,000.

0 10 20 30 40 50 Naut. M.

0 10 20 30 40 50 Stat. M

Names added from Burton & Speke's and Livingstone's Maps are placed within (Brackets).

Kawele (Ujiji) 4° 58' 3" S.Lat. 30°4' 30" E.Long.
L. Tanganyika 2,710 feet above the Sea..

LAKE TANGANYIKA, according to Dr. Livingstone AND Lieut. Cameron.

The Lake as laid down by Livingstone (adjusted to Cameron's position of Ujiji) is tinted Blue.

---------- *Livingstone's Routes.*

Cameron's Lake is shaded, names in skeleton letters.

UJIJI
UKARANGA
KOWE
UHHA
UTEMBWE
MARUNGU
UHHA
UGUHHA
UKAWENDE
UKAWENDE
UHHA
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E. G. Ravenstein.

T. Pettitt & Co. Litho, London.

peculiar; while the water of all the other rivers is quite fresh. The shores outside are low, flat plains, with sand-banks and long grass, formed by all the drift matter of the lake gravitating towards its outlet. While Cameron was in the river a large quantity of drifted wood floated down the stream, and worked its way into the obstructing grass, without leaving any sign of its passage. It struck him that where these logs, 20 to 30 feet long, could go, ordinary canoes might progress without any extraordinary amount of labour. The current was flowing out of the lake at a rate of 1·10 to 1·15 knots an hour. The chief reported that, half way to the Lualaba, the Lukuga outlet received another river called the Lurrumbuji.

Leaving the Lukuga, the voyage was continued, and on the 6th the Kasenge Archipelago was reached, and with a fresh breeze Cameron completed his adventurous voyage, arriving at Ujiji again on the 9th of May.

On his way across the lake, when starting for his great westward journey, he intended to leave some of his men at Kasenge, and to go with the rest to make a more complete examination of the outlet, before finally starting for Nyangwe and the Lualaba. He expected to reach Nyangwe by the beginning of August, and the Yellala Falls of the Congo by November.

INDIAN FAMINES.

ENGLAND has now before her the reports by Sir Richard Temple on the "services of famine relief officers," of "landholders, and native residents," and on "European non-official residents." He is happy to say that "the list of officers who have done good work is a long one," and "if need should again arise for similar services, the present record will show the names of officers fitted by experience for every kind of relief duty." Including civilians, military officers, rajahs, native residents, marine officers, railway officials, indigo planters, and European non-official residents, I find about 294 names in the *Homeward Mail* of the 21st of December 1874. Every one of these men deserve not only the thanks of their immediate superiors, but, when the time comes, England will declare her satisfaction at the wonderful display of energy in her sons, and in her subjects. She is accustomed to long lists of military and naval officers—men who have deserved her thanks for the destruction of her enemies; but she has never had before her so long a list of men who deserve their rewards for saving the lives of her Indian populations, for fighting against the unseen demon of destruction hurling his unseen famine upon earth.

It will be long before England can comprehend the greatness of this contest or the difficulty of victory. She does not know the faculty possessed by her Indian fellow creatures of lying down to die. She hears of it now and then in her great cities in the winter time, when a timid, worn-out mortal submits to cold, starvation, and death, sooner than ask his neighbour for assistance. In India the end is accepted by thousands as their inevitable fate, taught them by traditionary belief. Against this fatalism the authorities have had to contend; they have destroyed the traditions, they have employed and fed the people, not with food grown upon the spot, but brought at a great expense, under great difficulties, from long distances, by every possible conveyance. Health, discipline, security, division of labour, all had to be thought of by a handful of men presiding over some 25 millions of human beings, of whom, says Sir Richard Temple, 4½ millions were in a starving condition. From the Viceroy down to the lowest and the least employed there must have been an amount of energy exhibited which can only be comprehended by those who have witnessed these famine scenes, and which never can be measured out with equal scales among the scanty heroes of the fight.

A few words taken from the minute of Sir R. Temple will show us the spirit in which the famine duties were undertaken:—"Mr. Stuart Bayley (Commissioner of Patna Division) held the most arduous and responsible office of all the executive officers:" he held larger, and more distressed districts, with about "2½ millions of people." All the relief operations of Patna, as well as the North Behar transport department, were under his general command; his current duties were conducted well, and he kept all classes at work without friction; "he was present whenever conjunctures threatened to arise, and he won respect and co-operation from officials and non-officials." In a man-of-war, in a regiment, officers experienced in the work have discipline at their command; to Mr. Bayley all was new, his inferiors had to be trained to their respective duties over a crowd, and a confusion, in a very Babel of language. I have experienced the scene. England knows nothing like it, or of the value of the supervision exercised by this gentleman. From his conduct we may form an idea of the conduct of all that come under the headings given by Sir Richard Temple—supervision—medical—transport by land, by river, and by sea—public works—relief—railways—irrigation—electric telegraphs—the Secretariate, and the duties undertaken by Zemindars and private persons. "When," says Sir Richard, "so many officers have done well, it is impossible to render due thanks to each individually; but to the body of the officers collectively, who have served on this occasion, the Government of Bengal desires to tender its acknowledgments with the strongest expressions it can use." When the time comes England will know how to thank them and all concerned in assuaging the terrors of this Indian famine.

There was something wanting when this famine was first brought to the notice of England, and there is something wanting at the end of it. We have not got a record of the numbers employed, of the works undertaken, or of money spent. Sir Richard hopes that the accounts will be ready "within three months of the close of operations," and that the officer in charge of the duty "will eventually present the charitable public with a statement showing how their funds have been spent."

We can glean a little of the magnitude of operations from figures scattered about this report, but it is possible that they only represent a small portion of the whole. There were 130 relief centres, there were about 4½ millions of famishing people; 250,000 tons of food had to be moved to and across the Ganges; there were 25,000 carts in one transport duty; 12,000 carts, and 12,000 pack bullocks in another. The reserve transport had 3685 carts, and 11,500 pack bullocks—representing about 23,500 pack bullocks, 81,370 cart bullocks, and an army of some 43,000 men to look after them—camels, elephants, boats, and ships are not counted. There were 4000 miles of

road on which 1,730,000 people were at one time working, and on which "1,750,000*l.* have been spent in six months." In the *Times* of the 4th of August 1874, Lord G. Hamilton puts down 6,414,250*l.* as the probable total expenditure. The work done, the people employed, and the people fed, make that sum look too small. It might have been better to await the preparation of the whole history before placing before us a portion of this great work, for which a loan of 10,000,000*l.* was asked and sanctioned. A minute of thanks is not, however, a record of all that was done; but we find things in this record which scarcely coincide with things that have gone before. Sir R. Temple in writing of some collectors says, "they promptly informed the Government of the failure of crops whenever it occurred." This we may remark is the ordinary duty of every civilian in charge of districts.—"They exercised foresight regarding the approach of famine," and they "exhibited self-reliance and self-help in mastering the affairs entrusted to them." Of the latter we have no doubt: of the foresight we have. On the 24th of April last, the Duke of Argyll told the House of Lords that this famine came upon them earlier than usual: "there was no alarm in the early part of September," and it was not till the 25th of October 1873, that Sir George Campbell "telegraphed to the Viceroy that, besides the failure of the July and August rains, there was additional failure, and therefore there was cause for grave alarm." If, then, the collectors exercised foresight, their superiors did not, or the advent of a famine might have been foreseen in August. Time is very valuable on these occasions: with a little more of it Lord Northbrook might have adopted a policy better adapted to the situation, than that which was forced upon him by the absence of foresight somewhere.

A few words will place the subject clearly before us. Lord Salisbury told the House of Lords that the sudden rise in prices, and the sudden destitution of the people, took many local officers by surprise, and made the transport arrangements faulty. In the *Mail* of the 4th of May 1874 we find, "The famine comes in these parts with a sudden rush," "people flocked by tens of thousands to the relief works." "There were scarcely any tools for them." They were for a time a disorderly mob. "There was immense waste and immense confusion." If the *Times* correspondent wrote truly, and we have no reason to doubt it, he gave us a picture of the scene five months after the Viceroy had issued his instructions, and eight months after the local officers foresaw and reported a failure of crops, and a coming scarcity of food. Reports and foresight might have existed partially, but not as a whole—it would have been well if Sir Richard had cleared up these contradictions.

Now for the other policy that might have been adopted if more time had been given to the Viceroy.

Most part of the area, over which desolation hung by a thread, is one of the most populous regions of the earth; it could not have reached that condition without fertility in its soil, without protection to life and property by the rulers, or without an equitable ministration of food by its agents. We will call these food agents "Banyans." They compose a vast body of men; they are in every village; they have sat at the receipt of custom for thousands of years on the same spots, often in lineal descent. In former times they had much consideration paid to them; they were included in the general taxation of the people; from time to time they arranged the price of food, while transit duties were levied from them on imported or exported grain. These taxes were, I believe, abolished all over British India in or about 1836. From that time up to the imposition of the income tax the Banyans were, I believe, relieved from all taxes excepting the voluntary municipal dues. Up to 1873 the condition of the populations is evidence of the good management of the Banyan as a cosmopolite item. We were told by the Duke of Argyll that three good seasons preceded the year of scarcity. It is, or it was, usual for Banyans and for some cultivators to keep a year's estimated stock in hand. It is quite possible that this practice, or the legend of it, prevented the alarm, natural on a failure of rain, from expanding till the end of October.

If the officers on the spot knew of the failure of the early rains, it is certain that the Banyans knew of it also. We may assume that they look out for their own interests. We know that the labouring populations of India are always on the wrong side of the books with the money-lender and the Banyan; and we may suppose that neither of these will give more credit when a scarcity is likely to break the bank of the population. It was suggested as a measure of relief for the afflicted area, that the exportation of food from it should be prohibited; but Lord Northbrook could not prohibit in October what had been done, or what was then doing. It is in evidence that thousands of tons of food were exported from the distressed area, or from its vicinity between September and November. The Banyans had the means of transport, and they knew of a good market.

The policy alluded to would have kept all this food on the spot, because a market would have been ensured to the Banyan at his own price, without the expense of transport. It has been shown by experience that under this policy the Banyans will import food; so that, if the Banyans can be persuaded to do this all over a famine area, it is evident that the policy is beneficial to them; while the importation of food and the feeding of their constituents by another is a direct interference with their ordinary trade, though it may tend to maintain the solvency of the general bank. The policy alluded to may be found in the records of the Sholapoor office, or in the Secretariate of Bombay. It was practised on my own responsibility during the great famine of 1833-34. My proceedings were approved of, and the outlay sanctioned by that wise and excellent Governor of Bombay, Lord Clare: the outline of it is simple.

Every officer in charge of districts receives weekly rain reports from his native subordinates. The failure of rain means a failure of food; this failure is known, or ought to be known, in the month of August. The Banyans are then to be consulted as to their stock in hand; the intentions of Government to give occupation to unemployed labour is to be declared to them; estimates are to be made of the possible demand. The Banyans are asked if they can meet it at their own price, Government undertaking to pay their bills. In the Sholapoor district the Banyans undertook the duty, importing during the season sufficient food for all demands, and securing to themselves the profits of their arrangement. The works on which the starving

labour was employed were simple. As the ordinary official duty of the districts was in abeyance, there was plenty of superintendence, while each gang of thirteen furnished their own overseer; clerks of the works visited the gangs twice a day, furnishing them with tickets; these tickets were exchanged for food at the nearest shop, and became the voucher for the Banyans' bill in the evening; police patrols were constantly supervising the labour, and the multitudes of those incapable of work.

Under these arrangements the Sholapoor district met this extensive famine with success. All that was done was arranged by the officer in temporary charge, in the discharge of his ordinary duties, on his own responsibility. The suggested measures were duly reported to and confirmed by Government. We do not find that any officer in charge of a district in Bengal, in 1873, assumed any responsibility; but, instead of being prepared by the experience of frequent famines, all seem to have asked their superiors what was to be done. Sir George Campbell asked the Viceroy, he reported to the Indian Council at home; and we find in the *Mail* of the 27th of April 1874, "that as Lord Northbrook and Sir George Campbell were not agreed, there was an argument for the Secretary of State stepping in on his own responsibility, and deciding the great question of the policy to be adopted." Luckily, the Duke of Argyll knew that he "could not do so with advantage." Lord Northbrook was left to carry out his own magnificent and liberal policy; he conquered his gaunt, his invisible foe, and retained his own authority.

However much the loss of responsibility in officers in charge of districts may be regretted, there is, perhaps, a more hideous shadow in the distance, rising out of the policy adopted by the Viceroy. It will be as well to look at it in its present shape before it grows into a reality.

The newspapers tell us that on a late visit to Sorepore, "a representative body of the leading native residents," in an address to the Viceroy, said—"We natives of India do ever naturally look up to our rulers for help in time of need, and the generous policy of your Excellency, which has recognised the duty of furnishing food to the famishing masses, as one of the functions of Government, will for ever endear your Excellency to the Indian heart." In reply, the Viceroy is reported to have said that Her Majesty the Queen had "been graciously pleased to notify her cordial approval of the policy of Government for the relief of their necessities"—and then he allowed that "in all countries it is the duty of the proprietors of land to aid in times of difficulty those from whose industry their wealth is derived in times of prosperity." Will these words nourish an Upas tree? Will the late policy prove to be the precedent for all future famines? There are signs of frequent repetition.

The Banyans are very numerous, they can combine for their own interests, they can raise the price of food beyond the means of the ordinary labouring classes. Lord Northbrook frequently evinced his desire not to interfere with private trade; every grain of rice he gave out was an interference with trade, and cosmopolitan duty; but this private trade went on in the famine districts from the beginning to the end of the famine. All of those who could find occupation left the Government Relief Works long before the harvest of 1874 supplied their food; there was, therefore, food in their respective villages. We do not know if any measures were adopted to ascertain the quantity of food in store; all we know is that its price was beyond the means of those millions who sought relief from Government, and that Government accepted this as a proof of famine.

It seems to be forgotten that a famine cess was ever laid on the non-cultivating portions of the Indian population; this cess prevented a rise in the price of food beyond its legitimate limits; it kept the Banyans in some discipline. While they were taxed for ordinary imperial purposes the authorities knew something of them; when they are not taxed they are unobserved, and they forget that they are integral parts of a great whole. The Banyan population is increasing. In the Deccan they extracted from their cultivating constituents from 75 to 250 per cent. per annum (see the records of Sholapoor, 1873-74). If they do so in Bengal, the shadow of famine is on the increase, for they can and they will raise the price of food, not in proportion to its scarcity, but in proportion to their own wants.

As these wants multiply, there is a decrease in the production of food. We have seen by a late report that the supply of Indian opium is increasing; jute, linseed, cotton, tobacco, and other things are occupying the food-producing lands, so that, while mouths multiply, the food decreases in quantity, and increases in price. The words of the Viceroy are as applicable to these Banyans as they are to the proprietors of the soil, but instead of aiding those from whom they derive their profits, they increase their misery, and drive them to despair. There were three good seasons previous to this famine. When was the food of 1872 exported from these regions, or was it all consumed? We have no statistics, we do not know of any inquiry; but, as we have shown, there was food. A native community has thanked the Viceroy for recognizing as a duty the feeding of a nation. The words will be adopted by all; the duty will not be lost sight of, unless England steps in to insist on fuller information than has been given. To enquire why, with so much experience before them, the Indian Government in England and in India has not prepared a famine code to be ready in the hands of every district officer, to act upon in cases of local or general distress? We have drawn the outline of a famine treatment; the machinery on the spot is better than any that can be improvised, and it is better to keep communities in harmony than to sever them by introducing foreign ingredients. We have no doubt but that all these points are well known to our Indian authorities. Responsibility has gradually died out; England, or a party in England, stamps upon the head any one who, in assuming it, goes beyond their narrow limit. There is no code for action when inaction is death. We have forgotten that, in emergent cases, it is better to act wrongly, than to ensure a catastrophe by inaction. The old wheels that used to run so smoothly are out of gear by friction and disuse.

Twenty-five years of ordinary and extraordinary revenue duties in the Deccan gave us a tolerable insight into current practice, and into old taxation. Systems and details vary in every Indian province, but the nature of man is not dissimilar; there were the

Tammany Ring in New York—frauds on the Stock Exchange of London—a Government Bank of Bombay failed, and the Banyans of Bengal have won. Every labourer is a source of income to some Banyan, and these labourers have been preserved to him when he would grant no more credit to them. All glory to Lord Northbrook and his Executive for the saving of human life; but there are things we want to know, and a future to look to. We ask the Indian Government to prepare for that future, and to tell us what steps are taken to ascertain the amount of stock of food in hand, or whether they accept a high price of food, put on by those most interested, as a proof of famine?

H. P. MALET.

A VISIT TO THE LANDES.

A FIRST hurried visit to this rarely traversed region left impressions so curious upon my mind that I resolved upon a second and more leisurely ramble whenever the opportunity should recur. It was offered me, not long since, at Bordeaux, and I gladly left the beaten paths to go again amongst the stilt-walkers, whose country is called, emphatically, The Desert. It is little known, even to Frenchmen. There is not much to fascinate in that vast, sterile tract, supposed to have been a former bed of the sea, which spreads over so large a portion of the Gironde and the Lot-et-Garonne—wave-like in its surface, shifting sands upon fixed sands, patches of cultivation, and the rear-guards of retreating forests here and there; now and then a bog; occasionally a perfectly horizontal plain intersected by a black-looking stream in a gully; and a few far-scattered villages, or groups of unwalled sheds such as might be met with by the traveller in Central Africa. In all this there is no attraction of the common kind; yet in the very monotony and dreariness, the almost Libyan solitude, the forlorn emptiness, so to speak, prevailing for immense distances, a sort of charm exists, which changes into absolute wonder when an inhabitant comes upon the scene—a grotesque creature clad in sheepskins, mounted on a pair of wooden supporters, reaching to his knees, and strapped to them and his ankles, with a scanty flock of sheep nibbling at almost invisible herbage, and, when addressed, so unintelligible to you, who have come from Paris, that he might as well be as silent as a Syrian bishop. From the Garonne to the Adour, from the Gelise—which smells like a tanpit—to the Bay of Biscay, these territories of South-Western France, the ancient Aquitaine, and more modern Gascony, extend, parts being half-cultivated, others hopeless gravel, some reclaimable sand, but all hostile to grain-crops of any description. The effect upon the imagination of all this barrenness, dreary in spite of the sun, is difficult to describe. The small cattle-herds are composed of beasts so diminutive and thin that they appear to have been starved out of their natural size. Whence they get their fodder and water is a puzzle. Again and again have the peasantry of the Landes attempted, in their ignorance, to fertilize the soil, if soil it may be called, by setting fire to what miserable vegetation flourished, or rather did not flourish, with the result of creating a worse aridity than before. The true offspring of the Landes are sea-pines, as they are termed by the French, dwarf oaks, and acacias. Enterprising societies, with handsome capitals at their command, have been formed to promote an improved agriculture in these Arabian wastes, and their money has been no less irretrievably lost than if buried with a wreck in the bosom of the Goodwin Sands. The *pin maritime*, however, redeems the department from utter poverty. This is a peculiar tree, not mentioned by Linnæus. Once planted—by what mysterious process Science is still unaware—it is certain to thrive, to shoot up, arrow-straight, to multiply its splendid cones, and, in its twentieth year, to yield the "resin harvest" which is the wealth of the wood-dwellers in the Landes. As tired of the sands that seemed interminable, I struck into the shade of these forests, that reach to the Pyrennees and beyond them, I came upon many a solitary man, woman, or child engaged in collecting the valuable exudation which is the material of turpentine and lamp-black. A notch is made in the trunk, near the root; a crescent-shaped pannikin of metal or earthenware, marked with the cypher, as it were, of its owner, is locked below; the valuable gum trickles into this, and, when full, is replaced by another: and the supply may continue for a century, without exhausting the tree. Some of the *resiniers*—the appellation of the people following this industry—dig a hole in the ground, near the roots, about a foot deep, the sides and bottom beaten hard and smooth: early in February, armed with notched knives, they rasp through the three layers of bark, taking care not to wound the skin, and laying this latter bare at intervals of a yard. After a month has elapsed, incisions are made in the heart of the tree itself, each cut being connected with the others, so that the flow descends at length through a single channel, which is 2 inches deep, and this stage of the work is accomplished by means of the notched knife, a wooden ladder, and a miniature hatchet. The gains from this labour after all are poor, albeit that throughout the Mesopotamia of the Gironde and the Adour, resin-water drinking is an infectious habit, like mineral-water drinking in Germany. It is smelt at every *table-d'hôte;* it is gulped in the course of morning walks; it spoils the native wine; it is, in a word, fashionable, in the Bordeaux sense of that term, for Arcachon is the Tunbridge of the Gironde, its very name signifying an unguent. Nor do I wonder at the pale, attenuated, saddened look of the "hut-men"—my few walks down those long vistas of pine were each succeeded by an excruciating head-ache, caused by the overpowering odour.

Other industries, however, are carried on in this desolate region, though the pine is to its people what the palm is to the Arab. It supplies the vine-grower with his poles, the tent-dwellers—of whom there are many in the Landes—with their pegs, the engineer with piles for foundations, the telegraph with posts, the road-maker with wooden kerbs, and the inhabitants, at once, of the forest and of the plain, with fuel. Thus the wood-cutter's occupation becomes an important one, as all the old trees are felled, axed into commercial shape, and drifted down the rivers, where these are accessible. Otherwise they furnish a supply of charcoal without an appreciable limit. So do the White Virginian Poplar, the Dutch Poplar, the willow, birch, and alder. But I saw few of them; it all seemed like an eternal march of pines, gloomy as a

picture by Gustave Doré. Seeking for the owners of these solitudes, who might give intelligent information concerning their capacities and prospects, I found them to be uniformly absentees. There are three classes:—absolute proprietors; colonising proprietors; and a wholly illiterate peasantry, animated by but one idea—that of "the good old times"—concerning which they can tell you nothing more than that they are past. The peasant of the Landes is a patriarch of the ancient type; the head of his family, and how does that family live amid these unproductive sands? I had several meals beneath its roof, presently to be noticed, and more heartiness or a warmer—I may say a prouder—hospitality never was accorded by Bedouin Chief to way-worn traveller. The salt was eaten so soon as you crossed the threshold. We ate fowl of a somewhat "ancient and fishlike" character, followed by lean pork; with these, cakes of rye-bread, exceedingly dry and black as a Spartan's broth. It resembled rather the Arab *Couscoussor* than the Italian *Polenta*, and contained an inordinate proportion of salt. Yet, with my rough hosts, in blouse and gaiters; quaint caps, never taken off, I verily believe, even in bed, outer sleeveless coats of sheepskin, with the wool turned inwards; and, in extreme weather, a garment like unto a burnous enveloping all—one of which I borrowed, and was thankful for, but could not buy—I enjoyed the primitive simplicity of that archaic shelter. There were several women and children in the abode which was neither a hut, nor a tent, nor cottage; but a thatch, extending from the trunk of a living tree, supported at the four corners by poles of pine-wood, open to all the winds that blow, and fenced about, for a foot in height, by loose stones, or blocks of half-burned clay. The women, when indoors, if the phrase may be allowed where doors are unknown, wore bright and pretty caps; beyond those limits, straw or black felt hats, by no means unpicturesque. Every shepherd of the Landes has several stations, which he designates as his homes; for the pasture will nowhere suffice for more than a few days as the food of even an ordinary flock. Each morning, he rises, just as the dawn is confusing the far distance with coasts and seas of gold, and puts on those unique "leggings" which, elsewhere upon the earth, are called "stilts"; but on the Landes are known as *Chanques*, 6 feet and 6 inches high, raising his feet about two-thirds of that altitude from the ground, and enabling the wearer at once to follow his flocks, to defy wolves, and to pass from one oasis to another with incredible rapidity. No horse in that region can beat him, and he can keep up with the railway trains between Arcachon—a name meaning health-specific—and Bordeaux. At a first glimpse of these fellows on a misty morning balancing their long poles and taking yards at a stride, I thought of so many spectres of the Brocken, so gigantic and supernatural did they appear. The stilt of the Landes is a slightly elaborate mechanism. You have the "upright" to begin with; then a jutting piece of wood, two-thirds of the way up, with a strap, and another leathern band for the knee; while the *echasses* themselves are shod with leather, to prevent both sinking too deep in the sand and slipping on the clay. It is necessary to practice, from the earliest childhood, this method of locomotion. In utter forgetfulness of dignity, I tried it. No clown ever came to grief more instantaneously, or more ignominiously. There was no question of walking; mere standing was impossible, I fell, flat as a dead Trojan in the Homeric drama. Propped up for a moment and released, the soft sand once more was all my own; but the bitterness of the failure was appeased by learning that the very go-cart of the Landes for babies, is a pair of stilts; the teaching of their use is, practically, a drill; the pupil must never stoop; however irregular the ground, he must preserve his perpendicular; and, great becomes his glory if he, with a nut-brown maid, similarly exalted, dance, at the age of fifteen, in presence of any admiring village, to the rhythm of that which, literally speaking, is a bagpipe. For, notwithstanding the habitual silence to which they are condemned, and the melancholy expression of their countenances, the shepherds of the Landes are gay, albeit—

"Quand nous fûmes dedans les landes
Bien etonnés
Nous avions le sable jusqu'a mi-jambes
Des touts cotês."

Not so the herdsmen. They belong to a heavy and sullen race, and while the creaking of their ponderous ox-drawn tumbrils may be heard from a distance, they are never known to sing; they see their wives and children only at wide intervals; they sleep without a roof; they make companions of the beasts they drive, who will receive their food from them, and from none else, and yet they belong by no means to the brutal or inhospitable orders of humanity. I chanced upon a wedding festival in one of their little, ragged, wizard-looking hamlets. Perhaps a bestowal of brandy from the recesses of my knapsack had softened the Landais heart. Spoken communication there could be none; but by waves of the hand, smiling grimaces, and nods of the head, I was made welcome. A bowlful of dry nuts was thrown contemptuously to where the pigs were grunting, which signified that the lover was an accepted bridegroom; for *donner les noix* is a dismissal. Then, on the part of the lady, a bedstead and a chest were exhibited, the former resembling a model of the middle-age rack, and the latter being filled with the gifts of neighbours. All the girls in the vicinity band themselves together to "keep off the dogs"—otherwise impertinent young men who would make a jest of the ceremony. This I did not see, for "the departure of the bed," with the rest of the trousseau, piled pyramidically in a cart, had taken place on the evening previous; nor did I hear the bridal-eve songs, though I afterwards obtained specimens of a few in Paris. In them occur such verses as "Her mother has dressed her," "Strew her path with branches," "Do not tremble, beauty," "The world began with a *yes*; it would end with a *no*," and "The oak shadows will be your canopy and home." And now begins the genuine Landais festival, which is made up of alternate gormandising, drinking, and dancing. It must be remarked, however, that this is a sketch taken from the abodes of the wealthier peasantry, and that it is also taken from a less dismal district than some across which I saw the stilt-men, and women and children, too, stalking like monsters of the mist, there being a great deal of fog here, at times, arising from the underlayer of clay. The general aspect is too hideous and depressing to permit of anything approaching to social vivacity. Yet, even in the apparently most wretched of cabins, of the kind I have already de-

scribed, I found bread, dripping, wine, red cream cheese, and Gallician sardines, with little granges, of the rudest construction, standing near, full of barley, clover-grass, and pine-cones, though all shrivelled, and suggestive of the question *cui bono?* A word remains to be said about the inns, or *auberges*, for even amid the wildness of that sepulchral land, places of common resort may be, at remote intervals, discovered, where the people sit under rude verandahs, singing in a dialect a good deal worse than Greek for me, but obviously shaped into songs of no very delicate character, and where a sort of white brandy, powerfully flavoured with turpentine, and a species of beer brewed from rye, were consumed, the intervals between the minstrelsy being filled up, as I was afterwards informed, by invectives against the lords of the soil, for, in the Landes, the peasantry denounce the proprietors as tyrants, a piece of flattery repaid by the proprietors by calling the peasantry a race of worthless wild animals. Even in their revels the stilt-walkers and collectors of resin do not appear cheerful; they resemble their country, with its alternation of drab-coloured sand and endless desolations of pine, dark and changeless, except where the bark has been ripped off, leaving the trees bare and reddened, as though some mysterious blight had passed that way. Nearer to the sea, more lively pictures may be seen, among the cottages of the vine-dressers; but a sense of poverty broods unmistakably over all, and the efforts made to reclaim the Dunes have proved, as I think I have already said, generally unsuccessful. There is an inland lake, moreover, known to the dwellers about it, as "The Sea of the Landes," but it is rarely navigated, and, from what I could learn, contains no fish worth netting, though, to a stranger's eye, its aspect is inexpressibly refreshing as it lies, waveless and blue, or rippling, red and violet, to its depths in the light of the descending sun. It was upon the margin of this water that, in an open-sided shed, a man lay dying. Of course, no curiosity would have justified an intrusion upon the scene; but it was evident, from the gravity depicted upon every countenance, that the event was regarded as a solemn one. Nowhere in the world are the graves of the dead held in deeper or more pious respect than by these semi-civilized toilers of the woods, and of an Arabia by no means *Felix*. In their little fantastic structures, which they dignify by the title of churches—being oblong barns, with a porch in front, and a belfry pendant on the side, prayers are continually said for those who have passed away; every spring a formal funeral service is celebrated by the members of the family, on an anniversary styled "the head of the year." I have, however, exhausted my notes and reminiscences, for the journey was a brief one, although infinitely pleasant. It is time to retake the train at Arcachon, and leave the simple solitudes of the Landes for the contrasting splendour of Bordeaux, the queen of the French south, with its brilliant theatre, its bridge of seventeen arches, level as any bridge ever was, and, while returning Paris-wards, I remember gratefully the little knowledge I had acquired of a people so innocent and unsophistical.

HORACE ST. JOHN.

IMPRESSIONS OF JAMAICA.

CHAPTER VII.—PEDRO KAYS AND THE BOG WALK.

THAT a journey from south to north of an island which measures no more than 40 miles in that straight direction; which boasts very fair roads; and which, though almost entirely destitute of inns and posting-houses, is renowned for its hospitality, should demand much preparation and, in particular, a long and difficult haggling in the matter of horseflesh, may seem to belong to the less credible order of travellers' tales. It is nevertheless a fact that before anybody not a resident in Jamaica can start with comfort on this little tour, the main part of which is but the run from coast to coast through the middle of the country, he must become the owner of at least a pair of horses which, except for this same land-cruise, he assuredly does not want. Buying a horse or two, and selling what you have bought when it has served your brief purpose, is only a form of hiring which obtains in Jamaica. I must do the Creole horse-dealers the justice to say that the mistrust with which a European is apt to enter on any transaction of the kind here glanced at has rarely a good cause. Never have I found fairer trading than in this respect; and I would decidedly recommend "the purchasing system" to any friend about to visit Jamaica, and to move rapidly about the island. As for the horses, the work they do, considering the smallness of their frames and the nature of their food, is amazing. As I have before observed, the prolific guinea-grass is much used in place of dry provender, and animals not only fatten but grow strong on this marvellous herbage. Nor does the continual heat of the climate affect the Creole horses, as a few days of sudden and overpowering sultriness in England will affect the jaded hack. Everybody in Jamaica, black, white, or brown, is born to the saddle; and merciful treatment of horseflesh is far more generally the rule in that island than it is, I am ashamed to say, with us who maintain societies for the prevention of cruelty to animals at home. There is no such society in Jamaica; but the cattle are none the worse for the want of it. Then again, the horse, or I mistake, is a tropical animal, requiring more care as he advances farther into cold latitudes. Pending my negotiations with Mr. Furtado, a brown man of excellent repute in St. Jago de la Vega, or let us rather say Spanish Town, I had a day or two on my hands; for, if I hesitated to buy, neither did this worthy dealer in horseflesh appear to be in the least hurry to sell. So, as I happened then to be at Old Harbour, and to have found some amusing black boatmen or fishermen, with an old pilot among them, who had recently caught a fine large shark and was preparing the skeleton thereof, I resolved on improving my new acquaintance. I was to have bought the bones of the shark, principally, as I remember, because of having been greatly interested by the peculiar setting of the teeth. We often hear of a shark snapping off the leg of a man, as easily as if the limb were but a stalk or a twig. Until I examined that long sweeping pair of jaw-bones, with the rows of small, serrated, shell-like, teeth, more in number than those of a reaping-machine, I could hardly comprehend the possibility of a clean amputation by such means; but I understood it then. These amphibious negroes offered to take me

on a little cruise; and as I had some curiosity to look at the strange islets called Pedro Kays, in the vicinity, I willingly consented to accompany them. It was the middle of a broiling hot day, and we whistled for a wind without getting much of one; but on the whole I did not regret my time spent with the negro boys, although my friend the pilot was not of the party in the pinnace. The Kays, four in number, take their name from Pedro Bank, which, with its dangerous shoals, coral reefs, and patches of sand and broken shells, extends 90 or 100 miles westward from the Portland Rock. The colour of the water pointed out to us all dangers, where any beset us; and the same would be the case in all weathers by daylight. The North-East Kay was the first we visited. It is about half a mile long, from north to south, and a little more than a quarter of a mile broad, the highest part being perhaps 15 feet above water. Very little soil is to be found on this rocky islet, which, nevertheless, is partly covered with vegetation. Breakers extend for at least a quarter of a mile to the southward; and some ugly little rocks peep up from the clear water on the western side; but there is a good anchorage just off the south-west of the Kay, in 2½ fathoms of clean sand. The landing is on the north-west shore; and a lovelier bathing-place could not possibly be imagined. Three miles to the south-west, we came upon the Middle Kay, a diamond-shaped islet with scarcely a spadeful of soil, but still more plentifully overspread with brushwood. Here, too, the landing was on the northern side, a reef stretching out fully a mile to the south. The largest of the Pedro Kays is 2 or 3 miles farther to the south-west of the Middle Kay, and is three-quarters of a mile long, with a breadth of a quarter of a mile or more. It has soil enough to grow a palm, and is distinguished by its having two wells of fresh water. The South Kay, which is nearly 5 miles beyond the largest islet, is surrounded by a reef, and can only be approached at a distance of 2 miles. I need hardly say we did not visit this, the last of the four Kays. During our cruise, the vast shoals of fish, and the almost equally numerous flocks of birds, were sources of astonishment to me never to be forgotten. Airing their bodies on the rocks inshore, by spreading out their strong pinions, and thus exposing the whole of their rusty brown-black under-plumage to the sun and such little wind as could be caught by this poor shift, were many of the vultures called by Jamaicans John Crows. As I have often, with too little thought, uttered the language of repugnance and disgust in speaking of these truly sacred birds, I will here avow that sense of error which no man should be ashamed to feel or to declare. Horrible and revolting as may seem to us the appointed work of the vulture, it is, if any instinctive habit in an unreasoning creature can be, a grand realization of the idea of duty, supremely ordained and submissively obeyed. The boundless craving of the vulture fits him for the performance of the most stupendous tasks. A flock of these birds, settling on a carcass far greater in bulk than their whole convocation, will stay there till they have cleansed every bone, so that it shall not taint the air in which it lies bleaching. This I have known done in a very few hours. What wonder, then, that the John Crow of the Antilles should be reverenced and protected? It is punishable by fine to kill one of these silent, solemn "officers of health;" and I hope our well-intending friends in the East who are for poisoning as well as for shooting and trapping tigers, will be careful lest, for every envenomed carcass of a man-eater, laid low by strychnine, they pay with a flock of vultures.

My negro companions and I fell to talking much about alligators. If we look at a map showing the south line of Jamaica we shall see evidence that such a topic is no unforced one in ordinary Creole conversation. Alligator Pond, Alligator Swamp, Alligator Hole, Alligator Kay—these are the suggestive names that dot the coast on that southern side of the island. I did not care to correct the prevalent fallacy by which alligators in Jamaica have been so designated. Probably, my black friends would have grinned immensely if I had informed them that they had never seen an alligator, but that the interesting saurian they were accustomed to mention as such was a crocodile. Of this truth I had fully satisfied myself a week or two before my cruise to Pedro Kays. The cayman or alligator of the American continent might be supposed to have relatives on the islands of the Caribbean seas; but, in fact, the formidable reptile of the Jamaican rivers and lagoons is much more closely allied, if, indeed, he be not identical with the crocodile of old Nile. Some naturalists will tell us that the difference is slight. One authority has personally essayed to convince me that the only distinction is a trifling matter of dental detail. He was quite wrong. The crocodile of Jamaica, as of Cuba, Haiti, and Martinique, as well as of the African Continent, is slender muzzled, which the alligator is not; has feet dentelated on the outer edge, which the alligator has not; swims with great facility, even against a rapid current, which the swamp-infesting alligator does not; is bolder far than the alligator, which has, indeed, been fairly described as a timid animal. But the difference in the head would alone be sufficient to distinguish the two creatures. Not only has the crocodile a longer and more acute snout, but his eyes are unprotected by those protuberances which are so characteristic a point in the alligator or cayman. Yet, I suppose nine in ten, even of generally well-informed Creoles persist in calling their crocodiles alligators. The mistake is important, in so far as that the fact of the true Egyptian crocodile being found at a very great distance from Africa, and close to another continent on which a different species abounds, is surely a noteworthy subject for scientific inquiry.

And now, having completed my bargain for horses with canny but conscientious Mr. Furtado, at Spanish Town, I have before me the account of a journey, to the beauties of which no language can do a tithe of descriptive justice. Mindful of the great necessity of making an early start, in that region of sunstroke and fever, I was so beforehand with the day in leaving my formal adieux at King's House, that not one of Sir Henry's sable household was up and stirring. Only a lightly-clad negress of ancient days was cleaning the floor, with fresh and fragrant oranges, when I found for myself the visitors' book on the vestibule table. Behind my pair of clever, active, willing, little horses, and rattling fast out of Spanish Town, I soon felt the most perfect contentment of mind, on every subject that occurred to me. If this was not a genuine pleasure trip, what was, I should have liked to know?

There are two luxuries for the thirsty traveller in Jamaica—luxuries with which he cannot begin too soon; partly because they are more wholesome early in the morning than at any other time, and partly because, plentiful as they are, one is not always sure of being able to get at them. They are, briefly, freshly plucked oranges and wat' cocoa-nuts. It is a curious circumstance that, if your negro servant is to be implicitly believed, nearly all the golden fruit of the glorious orange groves, lying freely open to you on your way, is bitter. "Dat bitter orange, massa," says Jem or Sambo, when you mildly desire him to halt and pluck. At last, I bethought me of saying I should like to taste a bitter orange; and then, with some stifled mutterings, my veracious attendant alighted slowly, and brought back a basketful of oranges that were not bitter, but, on the contrary, sweet to the very pips. The wat' cocoa-nut is even more delicious than the freshly-plucked orange. A *water* cocoa-nut, or a cocoa-nut in its youthful tenderness, when outer fibre and inner shell can both be cut through at a chop, and the "milk," falsely so-called, is bright, clear, sparkling, and cold as water from the hill-side, but with a flavour perfectly divine, cannot be imagined by those whose knowledge of cocoa-nuts is bounded by Mr. Treloar's matting and three shies a penny. A negro "swarms" a cocoa-nut tree, more or less willingly, for a quatty or two quatties—silver coinage of the value of three-halfpence each little piece. The manner of swarming, or climbing, is curious. Clasping the trunk lightly, but firmly, with his two hands, and placing the soles of both feet against the tree, he walks up, double, foot over foot, and hand over hand, the toes playing an important part in the business, while the heels stand out far from contact with the bark. My servant, alas, had a wooden leg; so I was beholden to chance-swarming for my wat' cocoa-nuts. By-the-bye, no stranger looking at that slender and graceful object, a cocoa-nut tree, seeing how lightly poised is the tall, straight shaft, and how small a space is occupied by the cluster of fruit which nestles coolly beneath the long drooping leaves, split on either side into long sword-shaped pinnæ, would think of guessing the weight of foliage and fruit at anything like a ton. Not merely a single ton, however, nor two tons, nor three, but very often as much as four, will be the weight balanced on that lofty and seemingly fragile stem, at a height of 60 feet. I say, to see this is not to believe it; but it is nevertheless true; and another strange fact about the cocoa-nut palm, easily explainable, it may be, by its endogenous growth, but strange for all that, is that the trunk is the same thickness all the way up; nay, that the trunk of a young tree, a few inches in height, or barely clear of the ground, is of the same diameter as a full-grown palm, bearing the heavy burden of leaves and fruit which has been mentioned. Let the reader look at any readily accessible picture or engraving in which a cocoa-nut tree is shown. A hundred to one he will find it altogether wrong. To begin with, the draughtsman having got into his head that the tall, slender trunk is flexible, gives it what he considers a pleasing curve, something approximating to Hogarth's line of grace and beauty. In reality, this palm is as upright and rigid as a flag-staff. You may see the leaves tossed and torn by a hurricane, while yet the trunk shall not deflect half a foot from its true perpendicular. I have just opened a volume of Bryan Edwards's "West Indies," which contains an engraving from an original picture by Agostino Brunyas, of a negro festival in the Island of St. Vincent, "drawn from nature"; and I find one of these fancy cocoa-nut palms, bending over with the all but inevitable conventional curve that no real palm ever did or could assume. But this is no worse, perhaps, than a picture I have lately seen of a flock of goats, with teeth in their upper jaws! The ways of painters are wonderful, especially in "drawing from nature."

From Spanish Town, and from St. Catherine's parish, in which that shadow of an ancient city stands, to the parish of St. Thomas in the Vale, the road is beyond question the most beautiful in Jamaica, if not, as many travellers have asserted, in the world. Having used the word "parish," I may as well pause to remark that the parochial divisions of the island are not such as an English vestryman or ratepayer would naturally suppose, a Jamaica parish having as little affinity to a parish in Great Britain as a Jamaica attorney has to that home-grown production, an attorney-at-law. Jamaica is primarily divided into three counties, by name Cornwall, Middlesex, and Surrey. The parishes into which these are subdivided are tracts of country as broad in some instances as the smaller counties of England. St. Thomas-in-the-Vale is not a large parish for Jamaica, but it is, nevertheless, large enough to contain mountain scenery of considerable extent. Its pride of picturesque and romantic loveliness is the long but never-tiring glen called, by a negro corruption as absurd and senseless as any perverted name that ever crept into general acceptance, "the Bog Walk." Originally, and by Spanish lips, this glen of dancing waters, the natural sluice of a winding valley, was called the Bocâgua; and hence Bog Walk. It is a wild, rocky gorge, so exquisitely clothed and adorned with countless forms of tropical vegetation that no poet's dream of fairy-land could outshine its gracefully fantastic splendour. Through its unequal floor of broken rocky masses, rounded and softened in their boldest outlines, rolls and tumbles the bright Rio Cobre, on its way to the sea. This river is formed by the union of the Negro, the D'Oro and many lesser streams; and, seeing how often it divides and breaks up in its pell-mell, helter-skelter course, one might almost fancy that a crowd of little rivers, pressed together but still individual and distinct, ran side by side without actually mingling. I don't know how many times the traveller has to cross this same Rio Cobre in going up or down the Bocâgua or Bog Walk. Perhaps twenty would not be an exaggeration. Now the snake-like stream is on your right, now it glides or dartles by your left hand, now it is on the right again, now it is almost hidden by a cluster of bamboos, graceful giants of the wonderful grass family, some of the tallest rearing their light feathering tops as high as 80 or 90 feet. At the entrance of the glen the hills are low. Quickly they increase in height as well as in steepness, until our road and river, twisting and twining together amid plantain-groves and orchid-covered cotton-trees of stupendous size, and groups of palms that make Chiswick and Kew deserts, not to be thought of without a shuddering chill, lies at the feet of sheer perpendicular cliffs awful to look up at. Flowers there are, such as we

see in sparing array at the Botanical Fêtes, here scattered in such profusion that the buried treasures of Port Royal and all the fabulous heaps of doubloons hidden in pirate-caves would not suffice for prizes to be awarded in this grand flower-show of the Bocâgua. Butterflies as big as birds, and birds much smaller than butterflies—so small that if Puck were to rob their nests he might avoid detection by replacing the eggs with carraway comfits—hover about the gorgeous blossoms, and sip the sweets while on the wing. This, as a pure matter of fact, is the habit of the humming-bird, or "doctor-bird," as a fine variety of the tribe is called in Jamaica. Thrusting his long bill into the calix of a flower, he hovers for a few moments above it, moving his wings so rapidly that they can hardly be seen even to vibrate, and thus causing the sound which is identical with the hum of a bee. No jewels flash rays more resplendent than those which dart from his vivid breast. How pretty looks the same plumage, dead and motionless in a glass case! What then is it living, pulsating against an orchid-bloom, or moving swiftly through the sunlight of the tropics? Simply indescribable. The Bocâgua—let us drop that hideous and meaningless cacophony, "Bog Walk"—widens as we approach Mount Diabolo, over which lies our road to the northern coast of the island. Let us halt for a while.

GODFREY TURNER.

(To be continued.)

COMMUNICATION WITH THE PORTUGUESE COLONIES IN ASIA AND EASTERN AFRICA.

A CONTRACT has lately been entered into between the Portuguese Government and the British India Steam Navigation Company to run a service of steamers between Lisbon and the Portuguese Colonies in Asia and Eastern Africa, in order that more regular and frequent communication might be established. The neglected state to which these valuable possessions have been reduced, owing chiefly to the want of frequent and direct intercourse with Lisbon, was much to be regretted. The exceedingly rich province of Mozambique, with which, doubtless, a valuable and extensive trade might have been carried on, was, until recently, dependent on two vessels for communication, which were irregular and uncertain in their voyages; and with Goa direct intercourse was even less frequent. While these provinces were left neglected, regular and frequent communication had been maintained for years past with the Portuguese possessions on the West Coast of Africa, and trade has there consequently increased. The variety of wealth, the abundance of highly valuable products, and the different industries with which the extensive territories of Mozambique could enter into the world's trade are well known; and great credit is due to his Excellency the Councillor João de Andrade, Minister of Marine, in having at last succeeded in establishing regular communication with Asia and Eastern Africa. Now that the new line is opened—the arrival and departure from Lisbon of the first steamer having already been announced—great commercial results may be anticipated; and we doubt not but that the Portuguese Government will shortly be able to congratulate themselves on this act of provident administration.

Reviews.

ORIGIN AND HISTORY OF DRUGS.*

IN both soul and body this book is a remarkable example of concentrated labour, knowledge, and thoughtfulness. Taking the body first, nothing in that has been left to chance or mechanical routine. Print, paper, type, binding, all exhibit a notable element in common, we mean *Brains*. The result is a handsome octavo containing upwards of 700 pages of matter excellently printed, with sufficient but no superfluous margin, of very moderate weight, and only 2 inches in thickness, bound to last a century, and needing no application of the paper-knife or its treacherous substitutes. What we call the soul of the book presents an extraordinary repertory of knowledge, accumulated by the experience and labours of two lives, and diligently sifted to the last attainable pitch of accuracy. Chance has given the present writer some scale whereby to estimate the labours of the authors. Under the head of *Manna* the items *Botanical origin*, *History*, and *Production* occupy two pages and a half. Yet, he happens to know that the material boiled down to this condensed result embraced among other things not only a large amount of out-of-the-way reading, but a considerable correspondence, and a journey by one of the authors to Calabria and Sicily.

No apology is needed for reviewing this book in a *Geographical Magazine*. To no sort of commerce did early geography owe more than to the trade in drugs; and no kind of goods travelled so far. More apology is needed for the presumption of a layman (in every sense, medically, pharmaceutically, and botanically) in undertaking such a task. At least the fact that the book can so interest such an one is of some weight.

As a layman, then, I somewhat regret the leading title, as tending to limit demand (unjustly) within professional boundaries. *Pharmacographia* will to many suggest much the same idea as *Pharmacopœia*, viz., rhubarb and magnesia, *fiant pilulae*, and the other old symbolical and wholesome lessons on the bitterness of penitence, which nature was thought to have placed in the way to bodily amendment, at least till homœopathy attempted to substitute sugar-plums and flowery paths.

To such a work we do not presume to come as critics, unless we should venture in closing to nibble a little at etymologies. Rather we draw near, like Sancho at Camacho's wedding, to drop a fork into the well-replenished caldron, and see what luck shall fetch us up.

The drugs are arranged according to the natural orders of the plants from which they are derived; and each article is subdivided into branches, such as *Botanical Origin*, *History*, *Production or Collection*, *Description*, *Microscopic Structure*, *Chemical Composition*, *Commercial Statistics*, and *Uses*. The last heading is, however, only indicated in the briefest manner, and this seems a thing to be regretted. The *History* has been treated with remarkable care, and this, we

* *Pharmacographia:* A History of the Principal Drugs of Vegetable Origin, met with in Great Britain and British India. By Friedrich A. Flückiger, Phil. Dr., Professor in the University of Strassburg, and Daniel Hanbury, F.R.S., Fellow of the Linnæan and Chemical Societies of London. Macmillan & Co., 1874.

confess, is the heading that attracts us most. Among the articles that we have found stored with interesting facts, we may name—*Aconite*, *Opium*, *Lemon* and *Orange*, *Olibanum*, *Chinchona* (not spelt so, however), *Gum Arabic*, *Cinnamon* and *Cassia*, *Benzoin*, *Camphor*, *Nutmeg*, *Clove*, *Rhubarb*, *Sandalwood*, *Cardamom*, *Grains of Paradise*, *Pepper*, *Ginger*, *Saffron*, &c.

Singular is the obscurity that has persistently hung over the origin of many familiar drugs and spices. This was not wonderful when the commerce in these drugs formed almost the sole links connecting the ends of the earth. Rhubarb and galangal from China and its borders; cloves, nutmegs, and cubebs from the Malay Archipelago; pepper, ginger, and cardamom, from Malabar, passed on to Europe, where the *things* became familiar as household words, at a time when the further end of this chain of commerce was as remote and shrouded as if it had been in another planet. But the obscurity in many cases lasts still, or has lasted till recently. *Olibanum*, or frankincense, forms a striking instance, although in that case the obscurity was due rather to the perverse ignoring of recorded facts than to want of evidence. Though the source of its production had been, from time immemorial, the southern coast of Arabia, and the opposite Sumáli region, yet it was long the fashion to represent this as an Indian product, and Dr. Birdwood's paper in the *Linnæan Transactions* for 1868 is believed to have first put the chief facts in a clear light. Jalap, that once familiar abomination, was not traced definitively to its botanical source till 1829 (p. 398). Galangal, which physicked the early Crusaders, and helped to spice the stews of the Plantagenets, is the produce of a plant only identified and described in 1870 (p. 581); the exact species (more than one) furnishing the American Brazil-wood of commerce are, I believe, still unknown; the origin of *Gum Elemi* appears to remain a matter of doubt, though the authors of this book think there is no longer room to question that it is the same as the *Lubán Meyeti* of the Sumáli coast, produced by *Boswellia Frereana* (Birdwood).

Very curious are the notices, which our authors have collected from choice authorities, of the early knowledge of drugs possessed by Egypt and China, those monumental lands of ancient civilization. Thus (p. 250) cloves are mentioned as having been in use in China under the Han dynasty (B.C. 202 to A.D. 220) by courtiers who held the spice in their mouths to sweeten the breath before addressing the sovereign. Cassia bark is mentioned in the earliest Chinese herbal, ascribed to the mythical emperor Shin-nung (p. 468). The same spice is supposed to be recognised in an Egyptian detail of the 17th century B.C., as well as gum imported from Arabia, and known by the name *(Kami)* which we still give it (p. 207). Paintings in the temple of Dair-al-Bahri, in Upper Egypt, illustrate the trade from Arabia in that remote age. In these paintings are representations not only of bags of olibanum, but also of olibanum trees in tubs or boxes, bearing an inscription—"Thirty-one verdant incense-trees brought among the precious things from the land of Arabia, for the majesty of the God Amon, the lord of the terrestrial thrones. Never has anything similar been seen since the foundation of the world" (p. 121).

Now and then, among these historical notices, we find curious examples of that conservatism which is so strong in normal human nature, in spite of present symptoms the other way. Thus, in 1522, when a Portuguese ship first brought direct by sea to Antwerp a cargo of pepper, and of those other Indian spices, which the great Low Country mart had been accustomed to receive from Venice, the goods were looked upon with great mistrust (p. 521). Again, those devoutest of believers in monopoly, the Hollanders, who extirpated the clove-tree in its native islands, in order to restrict the supply, used to kiln-dry their nutmegs before exportation, and then break the shell and steep the nut in milk of lime, all to prevent the possibility of germination on foreign soil. This liming had no other object, was quite needless even for that, and spoiled many nuts. But the prejudice in favour of these *limed* nuts was so great in some countries that the Penang nutmegs, which were not originally subjected to such a process, had to be limed in London, in order to fit them for re-exportation (p. 454).

As a specimen of the interesting matter to be found in this book, we had marked for extract, the sections on the *Origin* and *History* of Cloves, but our space does not permit the extract of two pages, and matter already so carefully condensed and digested admits of no abridgment.

Ibn Batuta, veracious as to events, but apt to be inaccurate as regards natural phenomena, gives a most incorrect, though curious, account of the clove: "What is imported into our country (he says) consists of the wood (or twigs); what the people of our countries call the *Flower of Clove* consists of those parts of the flowers which fall, and which resemble the flowers of the orange tree. The fruit of the clove is the nutmeg, which we know as the *sweet* (or aromatic) *nut*. The flower (envelope?) which forms thereon is the mace. And this is what I have seen with mine own eyes." *

The *twigs* here spoken of may be either a mistaken reference to some kind of cinnamon or cassia, or may be the *clove-stalks*, which were a familiar article in the middle ages under the name (in Italy) of *Fusti di gherofani*, and the like.† Our authors (p. 255) tell us that these clove-stalks are still a considerable object of trade from Zanzibar; but, apparently, only to use in the adulteration of the *ground cloves* sold by grocers. The fact that mace is an envelope of the nutmeg‡ seems to have given rise to a long enduring popular belief (to the truth of which the Moorish traveller here gives partial testimony) that the clove was the flower of the nutmeg-tree, and the cinnamon its bark. I was once asked if it were not so by a native friend in Upper India. Bodæus, in his commentary on Theophrastus (1644), takes occasion to contradict this fancy; and in the narrative of Mr. Funnel *(Dampier's Voyages*, 1707, iv., 261), we read:—"It is the commonly received opinion that cloves, nutmegs, mace, and cinnamon, grow all upon one tree; but it is a great mistake."

The *names* of the clove in western languages are divided between such as indicate its resemblance to

* *Voyages*, avec trad. par Defsémery et Sanguinetti, iv., 243.

† It appears, also, from a note of Lee's that there was a spice bark known as *Kirfat ul-Karanful*, or clove-bark.

‡ Sir John Maundevile, whose science was better than his veracity, says simply and rightly:—"And wytethe wel, that the Notemuge benethe the Maces. For righte as the Note of the Haselle hathe an Husk withouten, that the Note is closed in, til it be ripe, and aftre fallethe oute; righte so it is of the Notemuge and of the Maces."

nails, and such as are corrupted from the ancient *Caryophyllum*, whatever be the true origin of that. Even the Chinese call it *ting-hiang* or nail-spice (p. 250), and the Spanish and Portuguese *clavo*, *cravo*, Dutch Kruid-*nagel*, German *Gewürtz-nagel* or *nelke* ("nail-kin") follow suit. The Italians take up caryophyl in all the variations that they delight to play on their liquids, *garofalo*, *garofano*, and so forth. The French combine the two in their *Clous de Girofle* or *gilofre*, from which was taken the old English *Clove Gillo flour*e, which has again been divided, assigning the clove to the spice, and "gilly-flower" to a familiar clove-smelling plant.*

Obscurities perplex the endeavour to trace the history of drugs in time as well as in space. When the article is tracked back to the earliest occurrence of the name, doubts almost always arise as to its really indicating the same article. Take the cassia and cinnamon of Herodotus, the caryophyllum of Pliny, the cardamom of Theophrastus. Long disquisitions have been printed in past days as to whether these were the articles still known by the same names. The like questions constantly arise in relation to ancient geography; and in that field the present writer's conviction is that the traditional nomenclature has been, as a rule, faithful; *e.g.*, that the *Sinae*, the *Iabadin*, the *Zabæ* of the ancients indicate the China, Java, and Champa of modern times; and he would be apt to apply a like presumption to the nomenclature of drugs, making allowance for inaccurate description in both cases. But there are some remarkable exceptions even in geography. For instance, it would be rash and wrong (though it has been done) to identify the ancient *Gandaritis* with the modern Candahar. And in pharmacography it seems certain that *Cassia fistula*, a name now and for centuries applied to a laxative pod, was in the time of Galen a cinnamon-like spice-bark (p. 195); and that the *Cinnabar* of Dioscorides, instead of being an ore of mercury, was the resin called Dragon's-blood (p. 609); whilst the *Macer* of ancient writers is regarded by our authors as certainly not mace, but the bark of a Malabar tree, which in modern times has the same reputation as a remedy for dysentery† (p. 451).

Our authors adopt the derivation of *Ginger (Zingiber* or *Zinziber)* from a Sanskrit name of the spice, *Sringavera*, *i.e.* "horn-shape." Mr. Burnell, however,‡ has expressed an opinion that this is only a Brahminical corruption of the Dravidian name, which he supposes, for reason given, to have been anciently *sinchi-*, or *chinchiver*, represented now by Malayalim *inchi* or *inchiver* (for the Tamul tongues drop sibilant letters). If the Brahmins, "striving after meaning" in their own tongue, made this into *Sringavera*, the Arabs on the other hand appear to have imagined a connection with *Zinj* or Zanzibar, and to have called Ginger "the plant of Zinj" (see *Reinaud's Abulfeda*, i., 207, and Kazwini, in *Gildemeister, de Rebus Indicis*, p. 218). In Marino Sanudo's map of the world also (circa 1320), largely founded on Arabic sources, we find a rubric connecting *Zinziber* with Zinj. I cannot, however, find ginger anywhere spoken of as a product of Eastern Continental Africa, though Barbosa says a large quantity was produced in Madagascar, and Varthema says the like of the Comoro Islands.

In treating of sugar our authors say:—"An old Sanskrit name of Central Bengal is *Gura*, whence is derived the word *Gula*, meaning raw sugar, a term for sugar universally employed in the Malayan Archipelago, where, on the other hand, they have their own names for the sugar-cane, though not for sugar" (p. 651). But surely there is some inversion here. The Sanskrit word in question (*guda*, Hindustani *gur*), for sugar in its first ungranulated stage, would seem from the Dictionary (William's, pp. 290, 300), to mean primarily "a ball or lump"; then the ball or loaf of such sugar; and from this would come *Gauda Desa*, "the sugar country," for Central Bengal.

It is very difficult to realize a time when sugar was not the familiar standard of sweetness, and curiously reads Pegoloth's classification of the chief sweets of the middle ages, as *mele d'ape*, *mele di cannamela*, *mele di carrubo*, viz., bee-honey, cane-honey, and carob-honey. The last of these is, I suspect, the origin of *caramel*.

But in thus expatiating and digressing regarding what is but one branch of the mass of knowledge in this book, we do no justice to its more scientific aspects. That we must leave to others better qualified, but we cannot doubt that they will indorse our hearty praise.

H. YULE.

* In Gerarde the clove pink is called *Clove Gillofloure*, and the stock "Stocke Gillofloure" or "Gillouer."

† Called by the Portuguese *Arvore Santo*, and by the native Christians "Tree of St. Thomas."

‡ *Indian Antiquary*, vol. i., p. 352.

Cartography.

British Admiralty Charts.

SINCE our last notice (*Geographical Magazine*, 1874, p. 211,) a large number of Admiralty Charts has been published, amongst which there are several of general interest.

The shifting sandbanks along many parts of the British coast, irrespective of the changes wrought by the construction of new docks and harbours, lighthouses and beacons, necessitate occasional revisions of existing charts, and even partial re-surveys, and we need hardly add that a comparison of the old charts with these new ones throws great light upon the geological changes ascribable to the action of the sea. Of new charts three have to be noticed. The first* is a new edition of Sheet 3 of the east coast of England, based upon the surveys made by the late Admiral Washington and others, with additions by Captain J. Parsons, up to 1873. The topographical detail of the interior has been taken from the Ordnance Survey, and we only wish the officers of the latter would return the compliment, and insert upon their maps of coast districts the interesting features to be derived from the Admiralty Charts. A combination of this kind is very much to be desired, and would obviate the necessity, in numerous instances, of consulting two sets of charts. Indeed, a map which ignores the configuration of the sea-bottom, or confines itself to merely giving the high and low water-lines, most certainly fails in conveying an adequate notion of the physical geography of a country.

Captain Parsons likewise furnishes us with a capital plan of Folkestone Harbour, and, indeed, of the whole town up to the railway viaduct, from a survey made in

* 1630. England: East Coast. Sheet 3. Orford Ness to Crommer, 1:152,166. London, 1874. 2s. 6d.

1873.* The third chart† referring to the British Islands gives an elaborate delineation of Menai Strait, surveyed by Captains J. H. Kerr and H. R. Harris in 1872.

Crossing over to Continental Europe, we meet with charts of the coast of Sweden, between Nidingen and Hönö,‡ and including the approaches of Götheburg, and of the gulf of Bothnia.§ The former is based upon a Swedish chart published in 1869, the latter is a compilation from Russian and Swedish surveys which, contrary to the practice of the British Admiralty surveys, confine themselves to a delineation of the coast, and eschew inland features, including even prominent hills which might serve as landmarks to the mariner. In connection with Scandinavia may be mentioned a very fine chart of the south-western portion of Iceland,‖ which is based upon the Danish Survey of 1855, with additions from Bjorn Gunnlangsson's map (1849), and the French survey of 1859. This chart gives a very detailed delineation of the interior of the country.

From the extreme north of Europe we at once pass into the Mediterranean in order to notice a chart of Corsica,¶ based upon a survey by Captain Hell, of the French Navy (1824), with corrections to 1871. The whole of the interior has been filled up, and if the same attention had been bestowed upon this portion of the chart as upon the delineation of the nautical features, we should now be in possession of the beau-ideal of a map of this island, equally serviceable to the mariner as to the tourist. The requirements of the former certainly do not call for a detailed delineation of the interior of a country. He would be content with an indication of the principal towns, of the summits of mountains and other prominent objects, available as landmarks. But if the Admiralty once takes upon itself to fill in the interior—a most commendable practice, especially in the case of islands—the same care ought to be bestowed upon this portion of the chart as upon the coast-line.

A companion sheet presents us with plans of Ile Rousse, Centuri, Bastia, Florent Gulf, Calvi, Porto Vecchio, Algajola, Porto Bello, Galeria, Campo Moro, Ajaccio, Port Bonifacio and Pinarello, all from the latest French surveys.

Before quitting Europe we notice a chart of Kerch Strait,** principally from French surveys made in 1853, and corrected up to 1873. A marginal map shows Kerch and the adjacent coasts on a smaller scale (1 : 142,000), and is mainly based upon Russian surveys published in 1872.

From Europe we proceed to Africa. Captain Nares supplies us with a chart of Porto Grande,†† on St. Vincent, one of the Cape Verde Islands, surveyed in 1873, which is an exceedingly fine specimen of engraving. Captain R. C. Downer, of the merchant service, furnishes sketches of the embouchures of the rivers Opobo and Quabo, in the bight of Biafra.‡‡ The third sheet §§ contains a chart of Cape Amber and vicinity, from Captain W. F. W. Owen's old survey on a scale of 1 : 181,400, and plans of Port Ambavarene (Lady Frances), from a French survey made in 1848 (scale 1 : 43,200), and of British Sound (scale 1 : 50,000) from the surveys of Owen, and of French officers up to 1865. Finally, we have to notice a very complete chart of Perim Island,* and of the strait intervening between it and the mainland of Arabia, for which we are indebted to Lieutenant F. J. Gray, and the other officers of H.M.S. 'Nassau' (1874).

The surveys made by officers of the 'Challenger,' under the direction of Captain Nares, are successively being published. We have already noticed a chart of Porto Grande. In addition to this there are charts of Prince Edward, Heard, and Macdonald Islands,† surveyed by Captain Nares, and of Crozet Island, by Lieutenant Fourrier, of the French Navy, with soundings added by the former, as well as a chart of Kerguelen Island.‡ The latter has been compiled from a variety of authorities, from Kerguelen (1772), and Cook (1776), up to Captain Nares, but the chart, nevertheless, is still very incomplete. No doubt, on the return of the parties stationed there to observe the transit of Venus, we shall be furnished with an exact map of this interesting island, which, on account of its remoteness and lack of commercial importance, would probably have remained unsurveyed for many years to come except for this fortuitous event.

The cartography of Australia has been enriched by a capital chart of St. Vincent and Spencer Gulfs,§ from surveys made by Captains J. Hutchinson and F. Howard, in 1863-73, and by another of Port Curtis,‖ the intricate channels of which have been carefully laid down by Captain P. B. Bedwell and Lieutenant E. R. Connor in 1871-72.

Captain Moresby gives a further instalment of his labours in New Guinea, consisting of plans of Port Moresby and Fairfax Harbour,¶ surveyed by Lieutenant Mourilyan in 1873. The Solomon Islands to the east of New Guinea will be found delineated on a chart** based upon the labours of D'Eutrecasteaux, Dumont d'Urville, Krusenstern, H. M. Denham, and others, supplemented by information furnished by Messrs. Kerr and Tilley, members of the Melanesian mission. But in spite of this formidable array of authorities there yet remains a great deal to be done by future explorers before a satisfactory map can be produced.

The annexation of the Fiji Islands and the consequent stay there of British vessels has naturally led to the production of some new charts, which do not, however, add much to our previous knowledge, as derived from Denham, Wilkes, and others. Lieutenants H. Hosken and J. W. Brown, of H.M.S. 'Pearl' (Commodore J. G. Goodenough), have surveyed Nadronga Harbour,†† and revised Lieutenant G. E. G. Jackson's chart of Mbau Roads (1867), whilst Lieutenant Hosken supplies us with a sketch of Goro Island.‡‡

Passing to America we meet with a plan of Port San Juan, Porto Rico, from a survey by Don Evaristo de

* 1991. England: South-East Coast. Folkestone Harbour. 1:4,860. London, 1874. 1s. 6d.

† 1464. England: West Coast. Menai Strait. 1:24,300. London, 1874. 3s.

‡ 196. Sweden. Nidingen to Hönö. 1:50,000. London, 1874. 2s. 6d.

§ 2252. Gulf of Bothnia. 1:730,000. London, 1874.

‖ 2733. Iceland, South-West Coast. Portland to Sheffels Jökel. 1:270,000. London, 1874. 2s. 6d.

¶ 1131. Mediterranean Island of Corsica. 1:252,000. London, 1874. 2s. 6d.

1126. Mediterranean. Ports and anchorages in Corsica. London, 1874. 2s. 6d.

** 9205. Black Sea. Kertch Strait, 1:142,000 and 1:35,500. London, 1874. 2s. 6d.

†† 370. Cape Verde Islands. St. Vincent. Porto Grande. m.=4 in. London, 1874. 1s. 6d.

‡‡ 628. Africa, West Coast. Plans in the Bight of Biafra. ondon, 1874. 1s.

§§ 676. Madagascar. Ports and anchorages in the vicinity of Cape Amber. London, 1874. 1s. 6d.

* 2592. Red Sea. Perim Island. 1 m.=4 in. London, 1874. 1s. 6d.

† 802. Islands in the South Indian Ocean. Prince Edward, Crozet, Heard, and McDonald. London, 1874. 1s. 6d.

‡ 2398. Indian Ocean. Kerguelen Island. 1:292,000. London, 1874. 2s.

§ 2389. South Australia. St. Vincent and Spencer Gulfs. 1:304,000. London, 1874. 6s.

‖ 1900. Australia. Port Curtis, Queensland. 1:36,500. London, 1874. 2s. 6d.

¶ 2126. New Guinea; South Coast. Port Moresby and Fairfax Harbour. 1:24,200. London, 1874. 1s.

** 214. South Pacific. Solomon Islands. 1:1,043,000. London, 1874. 2s. 6d.

†† 176. Viti Levu. Nadronga Harbour and Mbau Roads. London, 1874. 1s.

‡‡ 162. Fiji Islands. Goro Island. 1:912,950. London, 1874. 6d.

Churruca, published by the Spanish Admiralty in 1872.* The officers of the Chilian Navy furnish us with a number of plans of great interest, which supplement existing charts, and ought certainly to be consulted when constructing a map of that portion of South America. These plans, seventeen in number, are collected on three sheets. The first of these† contains anchorages in the Chonos Archipelago, viz., Ports Lagunas, Yates, Perez, Tangbac, Nevado, Chacabuco, San Miguel and Harchy Bay, from surveys made 1870-71. The second sheet‡ supplies us with plans of Port Calbuco, Huito Inlet and Reloncavi Inlet, in the Ancud Gulf, surveyed in 1871. The third sheet§ gives plans of Port Yañez, Lamehuapi Cove, Milagro Cove, Muicolpue Cove, Ranu Cove, and Condon Cove, surveyed in 1872. This activity of the Chilian Navy is most commendable, and we trust will culminate in a systematic survey of the entire coast from the Tierra del Fuego in the south to the frontier of Bolivia in the north. A further addition to the geography of Chili has been made by Lieutenat Lecky, of the Royal Naval Reserve, in command of the Pacific Steam Navigation Company's steamer 'Auraucanian,' who supplies us with a chart of Port Tongoy,‖ in latitude 30° S. New editions of charts 1278 and 587 have likewise been issued. Plans of Patillos Bay and Pabellon de Pica have been inserted in the former, and of San Jose Roads in the latter.

An index sheet of the charts of the east coast of North America¶ will prove useful for reference.

In conclusion we ought to state that the whole of the Admiralty charts have been engraved for some time past by private firms, that they are equal in execution to the maps issued formerly, when a staff of engravers was specially employed upon them, and that by this arrangement the public undoubtedly effects a saving without detriment to the quality of the work turned out.

Stanford's Map of Metropolitan Improvements.**

THIS map has come to be published regularly every year on the opening of the Parliamentary Session, and supplies information which must interest every inhabitant of London. The improvements and public works to be sanctioned this year are not perhaps as numerous as in former years, but are, nevertheless, of considerable importance. New railways 20¼ miles in length are to be constructed, of which the Eastern Metropolitan, which will connect the inner circle with the eastern suburbs, is the more important; the Victoria Docks are to be extended, and several gas works are to be erected on the outskirts of the metropolis. These, as well as improvements sanctioned during former sessions, are shown in red and blue on the map before us, which likewise gives existing tramways and railways, and is, in fact, a full and carefully drawn map of the British Metropolis.

E. G. RAVENSTEIN.

* 478. West Indies, Porto Rico. Port San Juan. 1: 10,900. London, 1874. 1s 6d.

† 1328. South America: West Coast. Anchorages in the inner channels of the Chonos Archipelago. London, 1874. 1s.

‡ 567. South America: Ports in Ancud Gulf. 1: 40,000 and 1: 140,000. London, 1874. 1s.

§ 1281. Anchorages on the coast of Chili. 1: 20,870. London, 1874. 6d.

‖ 809. South America: Chili, Port Tongoy. 1: 73,000. London, 1874. 1s.

¶ N. Index sheet, East Coast of North America: Florida to Labrador. London, 1874. 6d.

** A new map of Metropolitan Railways, Tramways and miscellaneous improvements, deposited at the Private Bill Office, November 30th, 1874, for Session 1875. London, 1875.

Log Book.

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The Arctic Expedition.—The names of the two ships have now been decided upon. The 'Alert' will retain her old name, and the 'Bloodhound' will be the 'Discovery,' which is the name of the little vessel in which Baffin discovered Smith Sound. The following is the list of officers of the Expedition:—

H.M.S. 'ALERT.'

Captain . . .	George S. Nares, F.R.G.S.
Commander . .	Albert H. Markham, F.R.G.S.
Lieutenant . .	Pelham Aldrich.
,, . .	A. A. Chase Parr.
,, . .	G. A. Giffard.
,, . .	W. H. May.
Sub-Lieutenant .	George Le C. Egerton.
Surgeon . . .	Thomas Colan, M.D.
,, . .	Edward L. Moss, M.D.
Assistant-Paymaster	Edgar de H. Whiddon.
Engineer . .	James Wootton.
,, . .	John Pitt.

H.M.S. 'DISCOVERY.'

Captain . . .	Henry F. Stephenson.
Lieutenant . .	Lewis A. Beaumont.
,, . .	Robert H. Archer.
,, . .	Wyatt Rawson.
,, . .	Reginald B. Fulford.
Sub-Lieutenant .	Crawford J. M. Conybeare.
Surgeon . . .	Belgrave Ninnis, M.D.
,, . .	Richard W. Coppinger, M.D.
Assistant-Paymaster	Thomas Mitchell.
Engineer . .	James Melrose.
,, . .	George White.

The officers have commenced their special studies. Two in each ship will make themselves masters of magnetic work, two will take up the pendulum, two will be initiated into certain enquiries in astronomy, and one will take charge of investigations connected with spectrum analysis. Collections will be diligently made in zoology and botany; but it is very important that a geologist, well acquainted with all Arctic geological questions, should accompany the expedition, and this point has not yet been decided. Results of the utmost value will thus be secured in every branch of science, and, whether the season of 1875 be favourable or not, success is, humanly speaking, within the reach of the gallant young officers who are fully resolved to secure it. Pole, or no Pole, the exploration of such an area within the unknown region as was covered by the sledges of former expeditions, is success.

The Cession of Fiji and Commodore Goodenough.—In our number for May 1874 (page 57) we gave an account of the Viti or Fiji Islands, with a narrative of events down to February 1874, and a map. Since that time the joint Commissioners, Commodore Goodenough and Mr. Layard, have submitted their report, and the cession of this important group to the British crown has been accepted. The report of Commodore Goodenough is an exhaustive and admirably arranged public document, which has not only been of great use in deciding the questions connected with the cession of the islands, but which will continue to be most valuable hereafter for purposes of reference. It is a store-house of carefully sifted facts and well considered opinions, prepared in answer to a series of questions from the Colonial Office; while the appendix contains an estimate of Fiji revenue and expenditure for

1874-75, a statement of the public debt, statistical tables, and an important note on the tenures of land. In the debates on the cession of the Fiji Islands, which took place in the House of Lords on the 17th of July and in the Commons on the 4th of August 1874, a spirit of factious opposition on one side and a want of intelligence on the other led to this admirable report being spoken of in a way which is very discreditable. It was misquoted, falsely quoted, and jeered at. For instance Mr. Lowther alleged that the Commissioners sought to commit the Government, without further enquiry, to the acceptance of the Fiji debt, and that they suggested terms of cession which were inadmissible. They did nothing of the kind. They simply transmitted complete information, in accordance with their instructions.

Commodore Goodenough may well despise these misrepresentations. The character of that distinguished officer for accuracy and thoroughness in all that he undertakes is too well known to be affected, in the slightest degree, by the unthinking and ill-considered speeches of politicians. Nor were his services in connection with Fiji confined to the preparation of a lucid report. He preserved order for many months, collected accurate information, and prepared the way for annexation with remarkable tact and judgment. Among the names most honourably connected with the first page of the history of the new colony, that of Commodore Goodenough will always stand first. Fiji became a British Colony on October 10th, 1874.

The Unsurveyed World.—On the 1st of February Staff-Commander Hull, the Superintendent of Charts at the Admiralty, read a very interesting and important paper on the condition of the naval marine surveying service before the United Service Institution. He stated his objects to be the arrest of decay in the charts of our ocean highways, and the advocacy of more activity in the surveying branch of our navy. His paper was illustrated by a chart, so coloured as to depict the present state of hydrography, the coasts coloured red being surveyed, those coloured blue being partially surveyed, and the brown shade, covering a large portion of the globe, showing coasts which have been merely explored but not surveyed. Commander Hull began by calling attention to the surveys at present in progress. The 'Shearwater' (Commander Wharton) and the 'Nassau' (Lieutenant Gray) are at work on the east coast of Africa, south of Zanzibar, where a fine harbour has been discovered by Navigating-Lieutenant J. Dixon. The 'Sylvia' is ordered to survey the southern coast of the Japanese Island of Nipon, the survey being executed by Captain St. John, and his able assistant, Navigating-Lieutenant W. Pearce. On the coast of England, Staff-Commander John Parsons and two assistants, with a hired crew, have been closely sounding the approaches to Harwich, in the 'Porcupine,' and the shores from the South Foreland to Dungeness, as well as Dover Bay in close detail. Staff-Commander Hull, during 1873, made a minute examination of the bar at Portsmouth Harbour. On the east coast of Ireland, Staff-Commander Kerr and two assistants, in a hired steamer, have made a patient examination of the shoal banks near Wicklow Head, the bar of the Liffey River, and Wexford and Kingston Harbours. Navigating-Lieutenant Millard is continuing the survey of the north coast of Sicily, on which Commander Wharton was engaged in the 'Shearwater' before he was detached to Zanzibar. In the West Indies Commander George Stanley and one assistant, in a hired schooner, have been engaged on the south coast of Jamaica; and Navigating-Lieutenant William Maxwell, in the hired steamer 'Gulware,' has been actively engaged on the coast of Newfoundland. There are also special surveys being executed in Australia; while Captain Moresby has recently combined important discoveries with good surveying work at the eastern extremity of New Guinea.

After recapitulating the surveys that are actually in progress Commander Hull went over the vast extent of unsurveyed coast, and showed what an enormous amount of work remained to be done, and how low the surveying service had been brought down. In July 1873, including the 'Challenger,' there were thirty-six surveying officers employed, of whom only four belonged to the main branch of the service, namely one captain, one commander, and two lieutenants. Commander Hull then compared this deplorable falling off with the state of things in 1849, under Sir Francis Beaufort, when there were twelve surveying vessels in commission, and twenty-three officers on separate duty, besides Arctic ships. There were seventeen captains and twelve commanders. The paper then gave some account of the work in the Hydrographic Department, which is also overladen and overworked, and where the accommodation for drawing and arranging the charts is a disgrace to the country. In conclusion Commander Hull said—Finally, I entreat you all to let this branch of Her Majesty's service be so well recognised, as a useful element in the empire, that it shall be in some measure protected from those blasts of ruinous economy which periodically sweep over our country; remembering that, from its first establishment, the surveying service has been *second to none* in placing and maintaining the Navy of Great Britain in its prominent position among the forces of civilization.

Journey up the Yang-tse-kiang to Yunan.—Mr. R. A. Margary, an energetic young Member of the China Consular Service, is making his way up the Yang-tse-kiang River with the intention of meeting the Yunan Expedition under Colonel Browne, and Mr. Ney Elias, which has been recently despatched from the side of British Burmah.* He has travelled by boat from Hankow, and purposes to follow the line of the great Yang-tse to the entrance of the Tung-Ting Lake. Crossing its broad waters he will enter the river (Yuen-kiang?), which flows in at the south-west angle of the lake, and passing Chang-teh he will continue up the stream to the borders of the province of Quei-chow. There navigation will end, and the land journey commence in chairs over the magnificent passes of that mountainous province, and after twenty-five days travelling he anticipates reaching Yunan-fu. Foreigners are rarely seen, and Mr. Margary has been much mobbed in consequence. He at last ventured to remonstrate with a crowd that was following him, and was agreeably surprised by their soon dispersing. His opinion is that it is the nature of Chinamen to give in to anything which asserts superiority. "A kick and a few words

* Vide *Geographical Magazine* for January, p. 22.

in his own tongue, telling him he is an ignorant boor, will make a common Chinaman worship you." He describes the river as winding through marvellous gorges and crammed full of rapids (200 large ones having already been passed), while for miles it passes only the stations of wood-cutters, who form rafts out of fir trees (which grow in the greatest profusion about), and erect pine-wood cottages on them for the crew, who thence convey the timber to Hankow. Mr. Margary is travelling with two of the Yunan authorities, and this has proved of great advantage to him, though some delay has been occasioned thereby. He expects to reach Yunan-fu by the 30th of November, and looks forward eagerly to meeting Colonel Browne and his party.

The New High Priest of Urga.—Journey from Lhasa to Urga.—Through the quelling of the Tungan insurrection affairs are now comparatively quiet on the north-west frontier of China, and this has enabled the new *Kutuktu** or high priest of Urga in Mongolia to make his solemn progress thither from Tibet, the cradle of the Lama priesthood. This ecclesiastic, according to the *Journal de St. Petersbourg*, is of the very tender age of six, and he is the eighth representative of the hierarchical dignity he holds. The office is elective within certain Tibetan families resident close to the abode of the Dalai Lama at Lhasa, and to that of the Rinchin bogdo at Teshoo-Lumbo, and the election is conducted by the *Amba* or Governor of Lhasa, the Dalai Lama, the Viceroy of Tibet, and other authorities. Before setting out for Mongolia, the young priest was educated under the jealous supervision of Tibetan teachers for two years at a monastery about 3 versts from Budali, the residence of the Dalai Lama. Towards the close of last May the mission set out from Lhasa, journeying as far as Koko-Nor on horses and yaks and in carts, and beyond that point making use of camels and horses, the number of the former being no less than a thousand, and the latter twice as numerous. The Deputy-Governor of Lhasa, accompanied by his secretariat, started some ten days later; but owing to ill-health, was unable to catch up the mission. From Sinning, as far as the province of Alachan, the party were escorted by troops, but previously, while journeying close to the Khara-ussu River, they had had to secure a free passage by buying over the chiefs of an independent tribe of mountaineers, called Golok. The province of Alachan is situated at the angle formed by the Yellow River; and a reference to the map will show that this lies somewhat to the east of the direct route from Lhasa to Urga, but the deviation was unavoidable, owing to the complete devastation by brigands of the country westward. On approaching the Khalka provinces, crowds of pilgrims issued forth to meet the mission, prostrating themselves and bringing presents, and at the frontier itself the party were received by the Chadzobda, or chief of the high-priest's future retinue, and other high officials. On the 30th of October the entry into Urga took place amid great pomp and rejoicing, but the Kutuktu was not formally installed in his palace for two days, and took up his position instead in what is termed his yellow country house, being an enclosure of yellow stuff, surrounding seven felt tents. Around were grouped the tents of numerous princes and chiefs, and outside a large assemblage of Mongols. The Tibetans were anxious to avoid entering by a certain gate, which had been the scene of several executions, but by raising a cry that the ice was giving way just as the crossing of the river was being effected, the Governor managed to cause a hurried entry into the city by the gate referred to. The installation of the Kutuktu in his palace was a solemn affair. He crossed the square in front of the palace on horseback, the oldest chiefs of the Khalka States holding the bridle; at the door he was received by the civil authorities, and a grand service in the temple followed. During the ensuing days more solemn services, festivities and public games took place, and it is in contemplation to celebrate a fresh round of them during next summer. A great impulse has been given to all commercial dealings, which had been paralysed for the last few years owing to the death of the former priest and the troubled state of the country.

* See the *Geographical Magazine* for 1874, p. 7.

New Work on Natural History, etc., of East Turkistan.—The Government of India have arranged to publish an illustrated work on the Geology and Natural History of Eastern Turkistan, founded chiefly on the observations and collections of the late Dr. Stoliczka, who accompanied the recent mission to Kashgar and Yarkand, and died on his return homeward. The work will be in some sense commemorative of Dr. Stoliczka, and in accordance with a plan he had himself sketched out for the publication of his memoranda. Dr. Day and Mr. A. O. Hume, C.B., will edit the parts relating to fishes and birds, respectively; while Mr. W. T. Blanford will take up the subjects originally selected by Dr. Stoliczka himself, viz., geology, mammals and reptiles, and Mr. Wood-Mason, of the Indian Museum, the Crustacea and insects. It is anticipated that the book will form a most interesting and unique memoir on the natural history and physical geography of the distant and little-known regions to which it refers.

A Geographical Society in Egypt.—The Khedive, ever intent upon developing the material resources of his dominions, has charged Dr. G. Schweinfurth with the formation of a Geographical Society, which, like that of Russia, will enjoy a *quasi* official character. The Society is to direct the exploratory expeditions which it is proposed to send to the most remote parts of the ever-increasing territories acknowledging the sway of Egypt: it will trace out new roads of commerce, supply scientific observers with instruments, and promote the cause of science generally. The Egyptian General Staff, presided over, as it is, by several of the most experienced American officers, will prove a useful auxiliary to the Society, and has already furnished the *personnel* for an expedition despatched for the exploration of Dar Fur and the countries to the south of it. Dr. Schweinfurth is eminently fit for the task with which he has been charged. His fascinating volumes, *The Heart of Africa*, prove him not only to be an enthusiastic explorer, but likewise an able naturalist and careful observer of human nature.

We learn that Dr. Nachtigall, the German traveller, has returned from his extensive journeys a martyr to rheumatism. He is now using the sulphur waters of Heluan, and purposes to return to Europe in May.

Proceedings of Geographical Societies.

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ROYAL GEOGRAPHICAL SOCIETY.

Meeting of the 25th of January, 1875.

THE GORDON EXPEDITION.

THE President, SIR HENRY RAWLINSON, took the chair at 8.30 P.M. He informed the meeting of the safe arrival at Gondokoro of Lieutenants Watson and Chippendale, R.E., who it will be remembered left England last summer to join Colonel Gordon's Expedition as surveyors. Colonel Gordon, in a letter to Sir Henry, dated the 18th of November, reported that these gentlemen were then testing their instruments preparatory to their important journey, in conjunction with M. Linant, another member of the Expedition, who was under orders to proceed to the "Somerset" Nile of Speke, and Victoria Nyanza. On a previous occasion Sir Henry had informed the Society that he had applied for and obtained the sanction of His Highness the Khedive to communicate to them the geographical results of this great enterprise. It was gratifying to learn how heartily His Highness had entered into their views, for Colonel Gordon had stated in the same letter that he had been ordered by the Khedive to send Sir Henry duplicate copies for the Royal Geographical Society. Although it was wise not to be too sanguine in their expectations of events in a region so full of difficulty and uncertainty as Central Africa, he thought they might safely look forward to early and important intelligence from Colonel Gordon and his staff.

The Rev. JOSEPH MULLENS, D.D., Foreign Secretary of the London Missionary Society, then read a paper

ON THE CENTRAL PROVINCES OF MADAGASCAR.

Dr. Mullens said that the chief physical feature of Madagascar was the central mountain mass, which commences with lofty hills at its northern extremity, and retains them till within a moderate distance of its southern cape. This mighty mass is by no means uniform in its appearance. Ascending from the eastern coast to the capital, the traveller meets and successively passes three lofty mountain-walls, each supporting a broad terrace behind it. The first and lowest meets him at two days' distance from the coast: the second lies behind, two days further off, near the forest-station of Beforona: over the third he climbs by the lofty pass of Angavo, and then finds himself on the broad plateau of Imerina, the dwelling-place of the ruling tribes. On the western side also the terraces exist, and are descended one by one, though they are not so grandly marked as on the east coast, and are more easy to travel. From Imerina to the north-west, along the line of country followed by the two principal rivers, four special descents are seen, each being about 800 feet, and each having a distinct pass. The line across these passes is the line of the ancient tribal raids, and along which the present military posts are established.

On the east side of the island the three walls converge on a common point toward the northern districts. In the Sihánaka Province two higher lines meeting beyond the Alaoutra Lake, in latitude 16° 40', were seen; and the wild sea of hills resulting shows the grandeur of the forces employed in shaping their present form. Away to the south the terraces keep distinct, until they are crossed, in latitude 22°, by a strong range which runs from west to east, when they come to an end, and fall into that level plain swept by the south-east winds, on which M. Grandidier found new shells and bones of Sinbad's celebrated birds. The terraces seem to be between 30 and 40 miles wide, and are far from level. Strong winds, heavy storms of rain, waterspouts, torrents, have cut deep channels in the sandy red clay, which has been deposited among the gneiss rocks which form the basis of the island; and as these hills and cuttings follow largely the northerly set of the granite ranges, the water seeks an outlet in the sea, in a maze of red hills. On the west side of Imerina the red hills are even more conspicuous. A country so continuously hilly as Central Madagascar, Dr. Mullens had never seen in all his wanderings in the United States or in the Eastern world.

The principal portion of the central plateau is occupied by the plain of Imerina and its southern continuation the Betsileo Province. At its north end this plain is bounded by the mountain mass of Andringitea, and the hills of Manga and Molangána. On the east it begins above the Angavo Forest, and goes westward to Ambohiveloma and Itasy, where it falls into the western plains. In this part the province has a breadth of 90 miles, and a nominal length of 110 miles. Eastern Imerina is pierced by granite hills, and ranges more or less high, which bear upon their shoulders barren moors, swept by the hard east winds. The south has been greatly affected by the volcanic disturbances. It has few fertile spots, and its population is scattered and thin. The thoroughly cultivated parts of Imerina are spread over a space of 50 miles by 25: about 1250 square miles in all. Even here the level is not perfect. Low ridges of red clay run across the plain, generally from the west and north-west toward the south-east: and it is on these, and on isolated portions of them, that are built the numerous villages and towns.

Bordered by grand hills of varied forms, and studded with hundreds of villages and towns, Imerina is in many respects one of the most beautiful and picturesque provinces of Madagascar. Here it is gay with the brilliant green of the young rice; there it is shaded with dark patches of wood around Námehana and Ilafy. Here it shows the great turtle-head rock of Ambátomaláza, or the lofty towers of the Three Sisters; there the long slope of Fandravásana, the lofty peaks of Antogona, or the towering masses of Ankáratra. Here lie the broad waters of the Queen's Lake, with its little island embowered in trees; there stand conspicuous clusters of villages, with their neat huts, the green ramparts of Ambohidrapeto, or the towering amontana tree of Ambohidatrimo.

Over all the higher portions of Madagascar, and far into the lower plains, the chief constituent element was gneiss or granite. Whole ranges of it appeared on every side, and the enormous gneiss boulders scattered over the hill sides formed a conspicuous feature of the landscape. The central province of Madagascar has been the scene of volcanic eruptions on an enormous scale. Twenty miles to the south-west of the capital is a fine group of mountains, the lofty peaks of which stand conspicuous in fine weather against the clear blue sky. These are the Ankárat Mountains, which cover a space of 600 square miles. From the Imerina Plain, 4500 feet high, the traveller rises steadily to 6000 and 7000 feet before he reaches the foot of the great central peaks. These occupy a space of 54 square miles, and are five in number, with minor elevations around them. Their heights range from 8000 to 8950 feet, and are the highest mountains in the island. They are all of volcanic origin, and though no distinct craters were seen, it was observed that they were covered with broken lava. Near their feet on the east are other centres of volcanic outflow and great lava hills. On the south these streams run out for 25 miles. On the west and north also the long tongues of lava can be traced far into the plain, the lava and the clay lying distinct side by side.

In the neighbourhood of Lake Itasy, 40 miles west of Antanánarivo, and 25 miles beyond the central mass of Ankárat, new traces of volcanic agency were found, and from a lofty hill, overhanging the western end of the lake, numerous craters were seen, some of which were of an enormous size. In the midst of the group were little lakes and pools of water; and one charming piece of water, Lake Kazamba, Dr. Mullens believed had

never before been seen by an Englishman. Lake Itasy, which is on the eastern side of these volcanoes, had been formed by the elevation of the land and the outflow of the lava streams. At the western end it looked shallow; and the ground around it was very swampy. Towards the east, where its chief feeder runs in, the water is deep. It is not a ravine, with some natural barrier at its lower end, but a submerged level. Many streams flowed into it from the country round, and it has only one outlet, on the north, through the northern portion of the volcanic district. The lake is 8 miles long and 2¼ miles broad; it contains six little peninsulas jutting into the water, one of which is called Ambonihazo, "wooded hill." In Imerina the higher plateau has a breadth of 80 miles; but journeying south, Dr. Mullens found it growing narrower. At Sirabé its breadth was 60 miles. All down the Betsileo province it narrows still; and at Imahazony, on the line of 22° S. latitude, on the top of Kirianga, both bordering lines of hill on east and west, were seen 35 miles from each other; and the ridges immediately to the south crossed the country like a lofty wall, covered with forest, and fairly united the two. The Betsileo province, so far as seen by the travellers was clear of volcanic influence, but contained long gneiss and clay ridges, which cross it from N.N.W. to S.S.E. Near Fianárantsoa these ridges lie close to one another, with but narrow valleys between; and in certain localities the massing of the mountains was very grand. On travelling from that town southward, near the little village of Ambalavao, some noble masses overhang to the west, while the grass on the lofty eastern hills was all on fire, and long curving lines of flame served both to show the form of the hill and to light up the darkness of the night. On the east is an enormous hill of gneiss; a few miles further to the south-east, where the forest ridge begins, is another mass nobler still, called Ambondrombe, which is believed to be the entrance to the spirit world. On the west again the hills seemed to increase in vastness and in number. Within the plateau were the noble rounded hills of Iandrainbáki, the high peak of Iody, the curving ridge of Kirianga; while outside them all, on the edge of the plateau, was the lofty, serrated granite ridge of Kipaseha, stretching away to the southward for 30 or 40 miles. The vast bay formed by these wonderful mountain masses contains the broad green plain of Ambohimandroso, rich in rice, and supporting a large population.

The Betsileo Province had many features of grandeur and beauty about it; but its fertile and well-cultivated spots are few. It contains five districts:—Ambositras, Ambohinamboarina, Isandra, Ilalangina, and Iarindrano. In the political survey of the country, it is usually described as within the Matsiatra or beyond the Matsiatra. The Matsiatra is its principal river, and it is well fed by numerous streams, which rise from the granite and gneiss hills. The water is abundant, and very pure. The most southern district is termed "Iarindrano" (full of water), and well deserves its name. It has one special river, the Manartarana, which rises in the hill of Ambondrombe, and makes its way sluggishly across the clay plains to the west, until it finds an outlet north of Iandraimbaki, whence it falls into the Mozambique Channel. Smaller rivers, like the "Ranofotsy," join one or other of these. The chief feature of cultivation in the province is rice; and the ingenuity with which the peasantry appropriate the water to its sustenance deserves high praise.

The population of these two principal provinces of the island, Imerina and the Betsileo, with all their districts, may be estimated at 1,700,000.

The journey from the capital to the Silianka Province, 100 miles to the north, was next described by Dr. Mullens. In its general structure it was found to be a vast basin in the midst of hills, with a clear lake and enormous swamps in the centre. The hills cross the country in parallel ridges at an angle of N. 16° W. The water was still high in the basin, and on three sides touched the foot of the hills; in consequence, whenever they passed from one ridge to another, they had first to wade through the swamp lying at the foot. For miles upon miles in the open centre, as well as up its many arms, the swamp was beautifully green. Two water-plants grow profusely there, the *Zozoro*, a solid triangular papyrus-reed, 16 feet high; and the *Herena*, a flat sword-blade, which reaches 6 or 8 feet. In the centre, though lying nearer to the eastern shore than the western, is the lake of Alastra, which is 37 miles in length and 4 or 5 broad. The population of the entire district was estimated at 40,000. The district was about 60 miles in length by 35 in breadth.

The last journey was also over a country perfectly new. The direction traversed was N.N.W., which is the course taken by the Ikiopa and Beteiboka rivers, into which the province of Imerina is to so large an extent drained. It extended a distance of 230 miles, and occupied Dr. Mullens and his party sixteen days.

The descent by this route from the plateau of Imerina to the level of the sea is, in its upper portions, more gentle than on the east coast. Four or five broad terraces may be reckoned over which the road passes; the fall in the ground is moderate from one to the other; and the path, as a whole, was found to be one of the easiest in the island.

The first portion of the journey traversed the district of Vonizongo, which lies north of the parallel hills among which the Ikiopa runs, and is shut in by the great gneiss ridges of Lohavohitra and Ambohimango. The southern portion of Vonizongo is full of valleys cut out by the streams from Lohavohitra, and is rich in water and its offspring, rice. The north has high, bleak moors, among which are several beautiful valleys.

Descending the moors by an easy pass over a red clay ridge, the travellers went down into North Vonizongo, a valley 25 miles long. Enclosed by two lines of hills, east and west behind these hills, are broad clay moors, scored in all directions by the running waters, and all drained directly or indirectly to the west and north. At the north end of the western line of hills is a noble hill of gneiss, Angávo, which Dr. Mullens described as one of the boldest precipices he had seen in Madagascar. The waters had circled around it down the valley, and had cut out a vast bay in the clay deposits at its feet.

On one of these clay hills is the pass of Ambatomena (red rock), which gave them a second descent of 800 feet on to the second terrace. This terrace was 48 miles long and had a steady fall to the northward. It presented two parallel valleys drained by a stream, called "the wooded river" (Mánankázo), with great hills on the west; and it contained in a line five little towns, which are the Hova military posts. These posts serve, (1) to maintain communication with the country to the north; (2) to protect the cattle herds which feed on the unmowed pastures; (3) to ward off the possible attacks of the Sakalava tribes who must enter North-West Imerina by this road. The people were found to be hospitable and kind, and very glad, in their extreme isolation, to welcome a friend. Toward the north of this section there were some noble hills; one of which, Andriba, separated two level and fertile basins, containing several villages, and presenting some beautiful clusters of the roña-palm. Between Kinajy, the first of these posts, and Malatsy, the last, the ground had fallen 1350 feet.

Dr. Mullens and his party had now finished the inhabited country, and were on the edge of a broad district, literally "Noman's-land." It took them two long days to cross this uninhabited country, which was about 50 miles in width. It was perfectly wild; and presented to them long ridges, falling lower and lower, and becoming fewer, trending off to the north-east, and leaving a broad, rich plain close to the sea. It gave them long valleys, grassy green with small vegetation, and well watered by small streams. In the afternoon of the second day they reached Mevatanána.

They were now approaching the sea-level: from this point their barometers fell 310 feet. Bembatooka Bay was yet 85 miles away; but the stream was rapid till they met the tides. For the remainder of the journey canoes were hired. At the end of the first day they reached the junction of the Ikiopa and Bedsiboka rivers, and pitched their tents on the sand-bank thrown up when the rivers were full. The spot was full of interest. In their travels among the Imerina Hills they had traced and mapped many of the head-waters from which these rivers had sprung. In the moor, near Angavokely, they had seen the fountains of the Mánanára, the Tsárasáhatra, and the Ikiopa; in the forest were the springs of the Varahina and the Sisaony; on the east of Ankarat were the Katsaoka and the Andromba. They had traced them over large tracts of country: here their junction was seen, and their united streams would bear them to the sea. The country was in general level, but it was covered by a few ridges through which the river cut its way. It was fresh and green everywhere. The air was warm and the vegetation largely tropical. Around them were grassy plains, gardens of plantain-trees, abundance of reed, and of the bamboo-cane with its spring leaves and feathery crown, while great tamarind trees, huge mango trees, or a few palms, stood out upon the undulations, or shared in the forest which clad the dark hill sides. More animal life was seen than in any other part of their travels. There were numerous small birds of gay plumage, blue and green; large flocks of wild ducks, small flocks of the paddy bird, the little white stork; now a heron flew up from the green brake; now was seen the flamingo fishing in the stream. But nothing could compare with the crocodiles. From the time they took to the canoes they began to see them—first in twos and threes, then in sevens and tens; at one time families of ten and twelve, and even twenty, were grouped together, sleeping in the sun; and at last, spread over a spit of land, no less than forty were found. They are timid, and, when woke up from their lazy sleep, at once hide themselves in the water. They watch cleverly for the cattle when they come to drink, and they are destructive also to human life.

The rich and fertile district now crossed was occupied by a portion of the Sakalava tribes. They are not numerous; their villages are small and scattered. They live on fish, on rice, on their cattle, and on the produce of their plantain gardens. They have few wants, and there is little trade. Mevatanána is the first of seven Hova towns, which are really military posts; they lie in a line along the river, and end at the port of Mojangá. Dr. Mullens saw five out of the seven, and was most hospitably welcomed. At Mojangá he and his party were picked up by the steamer 'Malacca,' which had recently continued the line from Zanzibar and Nosibé, and soon found themselves on the way to Zanzibar and home.

The Malagasy people who inhabit the island are a single race; they are divided into three principal tribes, occupying different districts. After referring in detail to these tribes, Dr. Mullens, in conclusion, said that as a people the Malagasy were not far advanced; their almost complete isolation from the world at large had greatly retarded their progress. They were thoroughly tribal in all their institutions still. They are clans in form, as well as in spirit. The prince was their chief, officially the owner and lord of all they had and all they were. All obligations were paid by feudal service; officers were remunerated by lands, and by the assignment to them of the service of so many inferior men. No salaries had been paid in money till recently; everything had been paid in service or by gifts in kind. The hump of every bullock killed belonged to the queen. Things were far behind, but they were a kindly people, an orderly people, a loyal people. They had a great affection for their queen, and the queen—who was an excellent Christian lady—had a warm affection for the people. An intelligent people, they had learned much from their English friends, and were improving daily. There were more than a thousand congregations among them; some three hundred thousand of them were more or less under instruction; and many thousands proved by their example that they were not only intelligent but sincere.

In the discussion which followed the reading of this paper Sir BARTLE FRERE said that what he had himself seen of the north-west of Madagascar impressed him with the conviction that it was one of the most beautiful parts of the earth. He did not think anything in India could compare to the great bays of Bembatooka and Passadava, and the mountain masses to the north which were visible from the sea-coast; while Johanna, one of the Comoro Islands was certainly one of the most lovely spots he had ever seen. With respect to the fauna and flora of that part of the world, he said that they were of the greatest possible interest, for remains were found of plants, birds, and beasts which must have existed in the great continent, of which no historical records have been preserved. He regretted that there was not that interest taken in Madagascar that was manifested even so far back as the reign of Queen Anne. He then spoke of the beneficial influence which the teaching of the missionaries had upon the religious education of the islanders, and he was glad to say they were fast becoming a civilized people.

Meeting of February 8th, 1874.

THE President, Sir HENRY RAWLINSON, took the chair at 8.30 P.M. His Royal Highness the Prince of Wales, Mr. Ward Hunt, and Vice-Admiral Hornby were present, and the crowded audience included many naval officers and men of science.

The members of the Arctic Expedition, who were present were Captain Nares, Captain Stephenson, Commander Markham, Lieutenants Aldrich, Parr, Giffard, May, Rawson and Fulford, Sub-Lieutenant Egerton, and Dr. Colan.

The old Arctic officers present were Admirals Collinson, Ommanney, Richards, and Sir Leopold M'Clintock; Captains R. V. Hamilton, Moore, and Nares; Mr. Clements Markham, Mr. J. Biggs, Dr. Lyall, and Dr. Ede.

THE ARCTIC EXPEDITION OF 1875.

SIR HENRY RAWLINSON said that the crowded state of the meeting, and the attendance of so many distinguished persons, testified to the warm interest that was felt by all classes in Arctic discovery, which was the subject of the paper about to be read to them that evening. Perhaps, under such circumstances, before they proceeded to the regular business of the evening—that of calling on Admiral Richards for his paper—it might be as well if he said a few words by way of introduction. He ventured to remind the meeting that the Royal Geographical Society took some credit to itself, and, he thought, with justice, for the share which it had taken in launching that great undertaking of the Arctic Expedition. In spite of opposition, in spite of discouragement, in spite of indifference, the Royal Geographical Society had always worked long and energetically in keeping this one object in view. At length they had succeeded—and it was only fair now that they had succeeded, that those gentlemen who had borne the brunt of the battle should be merited accordingly. He would, in the first place, mention that throughout they had received from Admiral Sherard Osborn every assistance. That gentleman was to have been present that evening, but they had to deplore his absence owing to domestic affliction. Captain Osborn, now just ten years ago, read a very interesting paper, in the course of which he pointed out the advantages of attempting to reach the North Pole by way of Baffin's Bay and Smith Sound, at the same time giving many valuable results which might be hoped for in any future expedition, dwelling more especially on the advantages to be derived from the training of naval

officers for Arctic services. In another paper, read by this gentleman in 1872, he advocated an Arctic Expedition; and both in speaking and writing, whenever an opportunity offered, he invariably urged this, and it was mainly owing to his efforts that the British public had been educated to understand the scientific and national advantages to be derived from a Polar Expedition. Then, too, there was Dr. Hooker, the President of the Royal Society, who, in 1865, pointed out the botanical results which would follow an Arctic Expedition; and he, in conjunction with Admiral Osborn, waited on the First Lord of the Treasury, and urged the necessity of a scheme to effect this purpose. Dr. Hooker had throughout been most zealous; but no persuasion could have induced Her Majesty's Government to send such a large body of men and officers to the Pole had not a young naval officer, Commander Markham, proceeded, in 1873, in a steamer northwards to test the power of steam in overcoming the difficulties of Arctic navigation. His cruise was perfectly successful, and he passed from place to place with complete ease; and it was mainly owing to the graphic account he gave of the cruise that the public mind was disabused of the great danger of navigating the Arctic Sea. It was by the aid of this gentleman, and fortified as they were by that scientific and practical authority, that they were enabled to go to the First Lord of the Treasury, and lay their case before him. Sir Henry Rawlinson took this opportunity of recording on the part of the Royal Geographical Society and, he believed, of science, the enlightened views held by the First Lord of the Treasury with regard to the matter, and he at once took upon himself the duty of laying the matter before the Admiralty. The Admiralty appointed a committee, composed of the *élite* of the Arctic naval officers, to consider and organise the expedition, which committee consisted of Admiral Richards, Sir Leopold M'Clintock, and Admiral Sherard Osborn, who were a guarantee that the arrangements with regard to the expedition would be fully carried out. Two vessels, the 'Alert' and the 'Discovery,' were to be sent out by the Government, and were now being prepared for the expedition. A very excellent body of officers had been selected for these vessels, whilst the supreme command had been placed in the hands of Captain Nares, who had not only had experience in Arctic discovery, but had actually travelled a distance of some 1500 miles upon ice. Added to these qualifications, he had had great experience in naval matters, and latterly he was in command of an exploring ship, the 'Challenger.' It was not too much to say of him that he was one of the most accomplished officers of the naval service. With regard to the scientific arrangements of the expedition, their indefatigable secretary, Mr. Clements R. Markham, proposed that the Royal Geographical Society should publish a manual giving all the information with regard to other expeditions, for instructions and reference, which should be accompanied with reprints from other languages relating to the subject, the whole to form a manual of Arctic geography, and this manual was now in active preparation. As to the actual preparations now going on at Portsmouth, they were being well carried out by Sir Leopold M'Clintock, and it was no doubt a great advantage that this department should be placed under the care of such a man, who was unrivalled in experience of such a character. A zoologist, too, had been appointed; and he trusted that before long a geologist would also be appointed, and in this he had been warmly seconded by *Nature*, which had urged the necessity and importance of a geologist to accompany the expedition.

Admiral RICHARDS then read his paper

ON THE ROUTE TOWARDS THE POLE, FOR THE ARCTIC EXPEDITION OF 1875.

AFTER a few introductory remarks, Admiral RICHARDS said that the Society had persisted through long and weary years, and under much discouragement, in urging the revival of Arctic discovery, and perhaps to no individual were they so much indebted for success as to their Secretary, Mr. Clements Markham. Arctic enterprise had always been popular in this country, and had the same attractions for Englishmen as those Eldorados of Mexico and the Indies held out to our Southern neighbours. He would not inquire too closely into the cause of this, but doubtless honour and ambition had their share. He always thought a good deal of misapprehension existed in the minds of many intelligent persons, and of the public generally as to the position we have occupied in regard to Arctic exploration during the last half of the present century. As a matter of fact, we had not sent out any exploring expeditions for the last 30 years, nor had they made any serious attempt but one to reach the Pole, and that was Parry's attempt in 1827, by Spitzbergen. His previous series of brilliant voyages, including that of Franklin in 1845, in the same direction, were revivals of the old furor to accomplish the North-West Passage. Had Franklin returned moderately successful, his expedition would have been followed by a similar one in the direction of the Pole; but owing to the unfortunate results of this voyage, it wearied out the nation, and it was not to be wondered at that, so far as this country was concerned, Arctic enterprise slept for so long a time. But still some peril must always be incurred in a new enterprise, and the sacrifice in this case was large because the experiment was a great one. It was perfectly well understood why the crews of the 'Erebus' and 'Terror' perished; but they had learnt much since that time, and it was impossible that, to a certain extent, the same dangers would arise as formerly. No service whatever, he was of opinion, was more faithfully carried out than the search for Franklin. The commanders of these expeditions had a delicate task to perform, and each did his best, according to his ability. There was no clue to follow; all went westward, and so far as they knew, that was the right direction; and but for the discovery by Dr. Rae, in that memorable journey which he undertook in 1854, the fate of these men might have remained a mystery still. Aided by its own instincts, M'Clintock and his companions finally solved the mystery, and the details of the voyage of the little 'Fox,' fitted out by Lady Franklin, were too well known to require further comment.

The experience of other Arctic explorers would now, Admiral Richards thought, stand them in good stead. It has been decided, and he thought wisely, in the interests of science, to say nothing of the interests of the country, to despatch a well-equipped expedition to endeavour to reach the highest northern latitude, possibly the Pole itself. The route proposed was the channel leading north from the head of Baffin's Bay, the southern entrance of which was known as Smith's Sound; and this route offered such a great advantage over all others because the course was a straight one from the entrance of Davis Strait to the 82° of N. latitude. The entrance to Smith's Sound was discovered and named by Baffin in 1616, when he sailed round the sea or bay which bore his name, and there was no record of its being visited until two centuries afterwards, when Ross and Parry passed its entrance. No people had shown a greater interest in Arctic exploration than the Americans, and when all further hopes were abandoned by the English in the direction of the North Pole, the restless and enterprising spirit was among them, and they persevered for years till they accomplished results which must be admitted by all to have been at least unsurpassed. Amongst eminent discoverers were the names of Kane, Hayes, and Hall.

After alluding in detail to the explorations of these explorers, Admiral Richards went on to say that, with regard to Smith's Sound, its longitude and the accurate delineation of its shores mattered little; all that they were concerned to know was that it was found to be a

navigable channel for ships; and it was the route which it was supposed the expedition was to follow. With respect to the character of the expedition, the vessels were of an excellent character, over 700 tons, and were furnished with steam power, and were now being fitted out at Portsmouth, under the superintendence of Sir Leopold M'Clintock. They had been made as strong as wood and iron could make them, and they had been fitted as no expedition had been fitted in this country. The crew of each ship consisted of about sixty officers and men, and they would carry provisions and store of coal for a period of at least three years. These numbers might appear small to those uninitiated in such service, but only ships of a certain class could navigate the ice in safety, and the necessity of carrying provisions, &c., for so long a period, rendered it absolutely necessary to reduce the mouths to a minimum. There had been appointed three ice-men to each ship, the remainder of the crew being men-of-war's men. As one of the objects of the voyage was scientific research, a former precedent had so far been departed from that a skilled naturalist was to be squeezed in each ship, and instruments and appliances of investigation of every branch of science would, no doubt, be provided. Arrangements, too, had been made for the supply of about sixty dogs, to be shipped on board at Greenland, for the purpose of drawing the sledges, and it might be interesting to know that several tons of the choicest dog biscuits would be provided for them. He confessed some doubt whether the biscuits would be properly appreciated, for his own experience was, that they preferred to eat one another.

In the ordinary course of things the two ships would leave Portsmouth about the latter end of May or the beginning of June, and take the usual route of Baffin's Bay, where they would endeavour to pass up Smith Sound. Here, probably in 81° or 82° N. latitude, if such a position could be reached, one ship would leave the other, and if so the remaining one would find plenty to occupy the explorers in 1876 in the exploration of the north coast of Greenland, and here the ship would probably remain for further orders. Admiral Richards presumed Captain Nares would endeavour to push northwards in his own ship, and they might be certain that should the two ships winter apart, they would use their best exertions to communicate with each other in the spring of 1876, and there was no reasonable doubt but that they would be able to do so.

The exploration to the north would be limited by the Pole, not 500 miles from the assumed position of the vessel of the second in command, and the exploration by ship east and west would be circumscribed; when it is added that part of the design is that a ship shall visit Smith Sound in 1877, should the expedition not have previously returned, it will, I think, be admitted, that all which human foresight can devise, will have been done to insure success, and to secure safe retreat. Although, however, we may not forecast, we may be permitted to speculate on the nature of the land or sea which lies beyond the 82° parallel, though, perhaps, we shall be treading on delicate ground.

We know that, from the Polar area included between the meridian of Spitzbergen on the east, and Melville Island on the west, a constant current or drift sets to the southward, through Smith Sound, through Wellington Channel, and the channels west of it, through Peel Sound, and Prince Regent's Inlet; that it sweeps with great violence through Hecla and Fury Straits, and also through Hudson Strait, and down the coast of Labrador. This is the current which forced the ice on King William's Land, and prevented the release of the 'Erebus' and 'Terror,' which carried the abandoned 'Resolute' out of Barrow Strait into the Atlantic, and which, in the month of July or August, annually clears the ice out of Smith Sound, unless some local conditions should combine in an unfavourable season to prevent it. The inference I draw from these and other circumstances is, that there is no continent or great mass of land in the Polar area north of Greenland or the Parry Islands, and it is somewhat strengthened, though, perhaps, not materially, by the fact that Sir Edward Belcher, in his voyage, saw no land to the north, from a considerable elevation on North Cornwall, neither did his travelling parties in their journeys westward in about the same latitude.

At any rate, on the existence or absence of continuous land to the north of Smith Sound, or of an archipelago, such as the Parry group, must depend the operations of a ship after leaving this position. If navigable water, or partially navigable water is found, it is possible that short work may be made of reaching the Pole; if continuous land is found, along the shores of which sledges can travel, a very high latitude, or, probably the Pole, may be reached in this way; but if continuous land, or nearly continuous land, is not met with, all Arctic travellers know that the distance to be accomplished by sledges and boats combined is a very limited one. I should not wish to be misunderstood in this remark. Travelling by boats alone during the autumn, when there are occasional leads of water, and before the young ice has began to make in September, is not difficult, nor so dangerous as ship navigation.

It is quite certain that no great and noble enterprise of this kind can ever be sent forth without resulting not only in material advantage, but without adding greatly to the sum of human knowlege, and so advancing the cause of truth.

A very few words more. Some of those who have been the strongest advocates of Arctic discovery have, perhaps unconsciously, been led to underrate or make light of the task which lies before the leader of this expedition. I may have been among the number myself; but it is very certain that, under the most favourable conditions, skill and perseverance in no ordinary degree, and the united efforts of all, will be necessary to ensure success, even moderate success; and it is equally certain that conditions have been met with, and may be met with again, which will baffle all human skill, and defy all human effort. Nothing is so uncertain as ice navigation: the best laid schemes may be frustrated, and a whole season lost, by the accident, for instance, of the wind hanging in a particular quarter for a couple of days during a critical time.

No human effort can force a ship any distance through a solid floe of ice, any more than she could be forced through the crust of the earth. If she cannot reach within such a distance of the Pole as will enable the journey to be accomplished by travelling parties in a given number of days, then success, so far as reaching the Pole is concerned, will not be obtained; but I am very far from thinking that the success of the Expedition depends on reaching the Pole, or even a very high northern latitude.

Mr. WARD HUNT (First Lord of the Admiralty) said the Expedition had his best wishes for its success. No pains had been spared at the Admiralty to equip it in the best possible way, and to select as the leader and officers those in whom thorough confidence could be placed. He felt deeply indebted to those experienced Arctic voyagers who had consented to take upon themselves the arrangements for the Expedition, and was perfectly certain that everything would be done that could be done to render the Expedition worthy of this country. Admiral Richards had warned the Meeting not to expect too much, and that advice had been well given. If the results did not prove to be great, there would at all events be the satisfaction of their having done their very best; but he felt confident that the results would, in a scientific point of view, be very valuable, and would greatly increase the knowledge of the physical nature of the globe. No doubt there were risks to be encountered, but they were not such as to deter Englishmen from pushing forward maritime discovery, or from going to whatever part of the world they were sent by their Queen and Government.

Admiral COLLINSON observed that it was greatly to be regretted that the Expedition would not have the advantage of the experience of the voyage of the 'Erebus' and 'Terror.' Unfortunately the journals of Franklin's Expedition had not been recovered. All that was known was that they reached 77° to the northward of Cornwallis Island; but this showed that the ice to the northward of Parry Archipelago was more in motion than it was further south. If the new Expedition came upon a firm impenetrable body of ice, such as existed between Melville Island and Banks Land, their progress would be entirely stopped. He was, however, pretty well assured that by following the land, and not turning a corner, they would get further north than had ever yet been attained.

Admiral Sir LEOPOLD M'CLINTOCK said the success of the Arctic Expedition would depend mainly on the sledging. The ships, it was hoped, would reach 82°, where the Americans reached two years ago. They would then be within about 500 miles of the North Pole. If such ice was there met with as was commonly found in Lancaster Sound, the Expedition would, without doubt, reach as far as the Pole. The system he himself had adopted for sledging was to break up the ship's company into parties of seven or eight men, each with an officer. A tent and a sledge were provided, and six weeks' provisions could be drawn along at the rate of about 12 statute miles a day. That would enable them to travel something like 600 miles—300 miles out and 300 back; but if several sledges were put on the same line of route, and sent back as they were emptied, it was clear that one sledge could advance greatly beyond 300 miles. If the land proved to be continuous, depôts of provisions would be sent on in advance. The ground then would have to be travelled over as quickly as possible to the most northern depôt, where the sledges could be filled up, and a start made for the Pole. The object should be to make the equipment as light as possible, so that the provisions taken might be the more. Besides the sledges to be drawn by the men, the new Expedition would have five or six sledges to be drawn by dogs. His own experience was that two dogs would drag as much as one man. They did not eat so much as a man, they required no clothes or cooking, and altogether it was much more economical to have dogs than men. On his last Expedition he had twenty-four dogs, and without them he should not have been able to do one-half of what he did accomplish. It was wrong to attempt to house them; they would live near the ship all the winter. If they were housed or treated differently from what they had been accustomed to, they would get sick and die. About 120 men would be sent out in the two ships, and with about 60 dogs he thought they would be able, by dividing themselves into about a dozen parties, to cover about 8000 or 10,000 miles of ground, and that would be doing a great deal. Temperature had very little to do with travelling. The moment there was sufficient light the travelling should commence.

Captain VESEY HAMILTON believed the Esquimaux dogs to be the most ungrateful creatures in creation. He on one occasion travelled several hundred miles with only one companion, and his duty for six weeks was to feed the dogs; but a week after he left them they would not recognise him in the least. During the winter they were supplied with food only once a week, but they ate their companions that died. Dogs were most useful in keeping up communications between the depôt ship and the other parties, but for unknown ground he preferred men.

Admiral OMMANNEY said that Englishmen must be grateful to their American cousins, who had cleared the way by successive years of exploration in Smith Sound, and had shown that the parallel of 82° might be reached. From that point, as a base, sledge parties would no doubt be able to attain very important results. He was glad to hear that the equipment of the Expedition was in such good hands as those of Sir Leopold M'Clintock, who was his (Admiral Ommanney's) first lieutenant when he discovered the first traces of Franklin.

Mr. CLEMENTS R. MARKHAM said he had been requested by the father of Arctic voyagers, Sir George Back, to express his disappointment at not being able to be present on this occasion to wish God speed to those officers who were now about to sail for the regions within the Arctic Circle. The work of the expedition would be to explore as large an area as possible of the unknown region, every part of which teemed with interest in all branches of science. The Pole, after all, was only a point, without length, or breadth, or thickness, and had no special interest in itself; and if the officers of the expedition equalled or excelled the work of Ommanney and M'Clintock, in 1851, or of M'Clintock, and Mecham, and Hamilton, Richards, and Osborn, in 1853, they would achieve complete success whether they reached the Pole or not.

Captain DAVID GRAY (introduced by a few remarks from Captain Henry Toynbee) said he saw, in his whaling cruise of last year, an open sea north of Spitzbergen, in 80° north. He wished to know how those gentlemen who advocated the Smith's Sound route accounted for the great rise and fall of the tide there, with southerly winds, and the open water said to have been seen by the 'Polaris.' At the Duck Islands, on the south side of Melville Bay, the rise and fall of the tide was 5 feet or 6 feet, while in Smith Sound it was about 18 feet with southerly winds. The only way in which he could account for this was by supposing that Smith Sound was merely an inlet in which the water became banked up. No clear water could exist where it was said to be seen by the 'Polaris' if there was any connection with the Polar Sea, because the tide would bring the ice down. If, however, the tides met at Cape Fraser, then Smith Sound must communicate with the Polar basin. He had navigated the east coast route for the last thirty years, and could frequently have sailed north as far as he liked, without let or hindrance, and if the expedition failed to reach a very high latitude by Smith Sound, he hoped they would go round and try the east coast.

Captain NARES said he had frequently been asked how he would use the compasses on reaching the North Pole? The answer simply was this, that the Magnetic Pole being situated at a considerable distance from the Pole of the Earth, there would be no difficulty to overcome in that respect. One of the chief causes of depression to those who wintered in the Arctic Seas was the long continued darkness. During the summer the sun shone continuously for 66½ days, north of the Arctic Circle, but in the winter it disappeared altogether below the horizon. At the Arctic Circle itself it merely just touched the horizon on the shortest day, giving three or four hours' twilight, but at the Pole there would be 182 days' darkness. The increase in the amount of darkness from the Arctic Circle to the Pole was very rapid. In latitude 75° there were 95 days of darkness, and on the shortest day the sun did not reach nearer than 8½° below the horizon. For about five months they could read the *Times*, when it was held up facing south. Where the 'Polaris' wintered in 82° they were 138 days without the sun, and for three months out of that time they would be in perfect darkness. In latitude 85° there would be 153 days of darkness. There was one counterbalancing point however, namely, that whenever the moon was above the horizon she was in her full during an Arctic winter, while in summer she was always in her first or second quarter. When Admiral M'Clintock spoke of having 53 days' provisions on a sledge, he meant at one time, but the party would be away 106 days, 53 days out and 53 days back, during the whole of which time it would have to depend entirely upon its own resources, without assistance from anybody else in the world. If a person started from London, went up the East Coast of England, then round Edinburgh, down the lakes of Cumberland, through Wales, and back to

London again, without calling at a public-house or speaking to a soul, he might have some notion of what Admiral M'Clintock had done. Captain David Gray had touched upon the two vital points with regard to Smith Sound. That Sound was either a *cul de sac* with the tide rushing up and increasing as it advanced, or the tides met at Cape Fraser, and the Expedition would then be able to go through.

The PRESIDENT, in concluding the discussion, said it was one of the great privileges of the Geographical Society to be able to introduce to the notice of the public matters of current interest, such as that which had been brought forward this evening. He wished, in the name of the Meeting, to express the great gratification they felt at His Royal Highness the Prince of Wales having been pleased to show, by his attendance on that occasion, the great interest he took in Arctic discovery. Such an event could not but be equally gratifying to the officers of the Expedition, who he trusted would, during the next three months, on many occasions renew their visit to the Society.

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BERLIN GEOGRAPHICAL SOCIETY.

THE most prominent article in the *Verhandlungen* or "Proceedings" devoted to the meeting of the 7th of November, is a careful review, by Dr. Roth of Dresden, of the Abyssinian, Red River, Khivan and Ashanti Expeditions, more especially with reference to the sanitary arrangements. He points out with good reason that the extreme care with which in the last case the entire campaign was compressed into the brief period before the rains, must be attributed the wonderful freedom from mortality of the troops, a fact contrasting most favourably with the disastrous results of 1826.

In the records of the meeting of the 5th of December we find a short memorandum by Dr. Bastian on the projected journey of Captain Von Homeyer, of the German African Association, into the interior of Africa by way of Cassandye and Muata Yambo, a route which Dr. Bastian thinks will prove practicable, as it is known to have been traversed by certain Portuguese travellers, and more recently by Livingstone. Herr Hildebrandt gives an account of his travels, in 1872, along the west coast of Arabia, and in Abyssinia. At Aden, Hildebrandt was forced into quarantine for ten days, and during this period his discomforts, pent up as he was in a small vessel under a burning sun, were many. He much prefers the way they manage these things in the Turkish ports of Arabia, where an officer comes on board and proclaims aloud that every passenger must hand over a dollar or undergo twenty days' quarantine. Hildebrandt crossed over to Massowa, where he was invited by Muzinger Pasha to make a tour with him into North Abyssinia. He first paid a visit to the Buri Peninsula, where he could trace the former existence of a volcano from the lava streams radiating from the cone. During the rains vegetation springs up so quickly in the intervening plots of ground, that even elephants find plenty of sustenance there. Some hot springs were also discovered, proving that volcanic agency is still at work. Hildebrandt paid a visit to the salt plain of Regad, which is about two days' journey in length and one in breadth, and which lies 200 feet below the sea level. The salt deposits are accounted for in two ways, one theory being that the sea formerly extended to the foot of the Abyssinian mountains, which bound the plain on the west (a fact borne out by coral deposits and sea-shells still visible), and that through volcanic action the Arrata Hills were upheaved, and thus shut in a lake which eventually dried up, leaving a crust of salt. The other theory is that the salt has been annually brought down from the lake of Alolebodd by two streams, the Kibreale and Arrata, and this appeared to Herr Hildebrandt to be the likelier of the two. The salt is carried away for consumption on the backs of women, and of camels, asses, and mules: is used also as currency, and is thus a synonym for wealth. From a plain to the south, of still greater depression, there rises a mountain called Oerteale, from the summit of which thick clouds of smoke issued. Herr Hildebrandt could find no allusion to this on the part of other travellers, and therefore concludes that he is the first discoverer of an African volcano. He ascended to the edge of the crater, in spite of the dissuasions of the natives, who assured him that the mountain was haunted by spirits and demons. On regaining the coast, he embarked on a dhow, and visited Assab Bay, the former settlement of the Italian Rubattino Company, since ceded to Egypt, who lays claim to all the western shore of the Red Sea. The French have endeavoured to organise settlements first at Edd, then at Shech Said opposite Perim, and last of all at Hobok Bay, with the idea of facilitating trade with South Abyssinia, Schoa, and the fertile coffee-producing Galla country. Herr Hildebrandt returned to Aden (to find a great portion of the collections he had left there unfortunately destroyed) and then crossed over to the Somali coast. He luckily met with no ill-treatment at the hands of the natives, though these are of a savage disposition, and are conciliated with gifts to induce them not to murder the Europeans who are stranded at Cape Guardafui. The Somalis look upon these gifts as tribute, and systematically plunder the wrecks, which, through want of a lighthouse, are of frequent occurrence. Herr Hildebrandt finished his travels by visiting Zanzibar, and thence repaired to Europe, which he reached in September 1874, after two and a half years' journeying.

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FRENCH GEOGRAPHICAL SOCIETY.

Bulletin for August.

THE first article consists of a portion of the journal as well as extracts from letters of the late M. N. D. Dupéré, who recently lost his life while exploring to the south-west of the Gulf of Tripoli. M. Duveyrier, who contributes the paper, remarks that the French in their endeavours to lay open this part of Africa, are exposed to much the same dangers which the English encountered and still encounter on the frontiers of Hindostan, where fanaticism and hatred make every step beyond the boundary-line one of peril. The next paper is one by M. J. Thoulet, on the gnomonic method of projection, illustrated by diagrams and formulæ. An interesting communication from the Abbé Armand David follows, in which the worthy father explains his object in recently visiting China, which was to penetrate into that perfect *terra incognita* Tibet, from the side of Mongolia and Koko-Nor. In this hope he was disappointed, as the Chinese officials refused to grant him passports, on the ground of the Muhammadan rebellion in those parts. Had Père David been a layman, he would probably have encountered little opposition, for Prshevalsky who succeeded in getting further than Koko-Nor found the Muhammadan rebels the most pitiful set of cowards imaginable. Père David started from Peking in October 1872, passed through Si-ngan-fu, and tarried five months in the Tsing-ling mountains, a little known range of about the same extent as the Pyrennees, and crowned with several peaks averaging 12,000 feet in height. In its mountains David found a curious intermixture of the flora and fauna of Northern and Southern China. He then ascended the Hankiang to Hanko (in one of the rapids of which he was upset, and contrived to lose part of his collections and baggage), and in the summer and unhealthiest time of the year, commenced to explore to the west of Fokien. Violent fever and bronchitis then overtook him, and it was with the greatest possible difficulty that he managed to reach Shang-hai in March 1874. The Abbé, in conclusion, details his views on the population of China, (*vide* our August-number, p. 213). We are glad to learn, from a footnote to this article, that the Society intend shortly to publish a *résumé* of the numerous

voyages made by M. David in China. Then follows a short account of M. De Puydt's researches in the isthmus of Darien, with a view to determine the question of the practicability of a ship canal, and the number closes with a review of M. Lenant de Bellefond's history of public works in Egypt from the earliest times.

Bulletin for September.

THE first article in this number is a *résumé* of the Marquis de Compiègne and M. Marche's journey along the course of the Ogowai River in Central Africa. This journey the marquis says was brought to an untimely end, just as they were anticipating success, owing to a combination of unfortunate circumstances, among which may be mentioned the death of a friendly chief, N'Combe, and the hostility of his subjects, the extraordinary lowness of the streams, wars between native tribes, and the ill health of the explorers. They started in the early part of January 1874, and at about 200 miles from the mouth of the Ogowai, came upon a tributary called Obanga, which is said to flow from the neighbourhood of the Gabun River, a fact of importance, as the mouth of the Ogowai is often obstructed, and communication might thus be possible by this other channel. The course of the Ogowai, as they proceeded, proved to be studded with rocks and islets, and numerous miserable villages were visible on the banks. At Okota they turned aside to visit the king of the country, and after a stormy discussion were forbidden by his Majesty to proceed further. A judicious use of threats, however, proved effectual, and the party was allowed to proceed. Rapids were continually met with, and the river here appeared to burst through a mountain range. After six days' travelling the rapids ceased, and the stream widened to about a mile in breadth, but sandbanks and rocks were not unfrequent. Two days' later, on the 27th of January, they reached a village called Lope, beyond which no whites had ever penetrated. Here, the obstinacy of the carriers detained them a whole month, and the time was spent in exploring the Okanda country, which extends for about 45 miles along the left bank of the Ogowai. The Okandas treat traders well, but are excessively lazy: their chief occupation is to buy slaves, whom they resell to the coast tribes. Eventually, on the 28th of February, 120 natives agreed to escort the travellers as far as the Osyebo country. On the 3rd of March they passed a large tributary called Ofue, which is the line of demarcation between the Okanda and Osyebo countries, and which leads to the land of the Shibe tribes, a race of remarkably fine men. The banks were here well wooded and formed a shelter for the Osyebo tribes, who often came down to the river's edge with an outward appearance of friendship, which, however, the exploring party did not venture to place trust in. On the 10th of March, at about six o'clock in the morning, they were assailed with firing from the bank, six men were badly wounded, and the chief boat was upset. After attending to the wants of the wounded, they resumed their journey, and soon reached the Ivindo River, a stream as large as the Ogowai, with some dangerous falls and rapids, and extensive lakes distant about four or five days' journey. Here, again, another attack was made upon the party by the Osyebos, and the canoe men, in great terror, beat a hurried retreat, in spite of the most urgent remonstrances of the French travellers. This unfortunate affair caused the collapse of the expedition, which, nevertheless, has proved that a properly-equipped party may penetrate by this route to a considerable distance into the heart of Equatorial Africa.

The above article is the most important in the September *bulletin*. The remaining ones claiming notice are an explanatory memorandum on a new system of geography, based on the usage of decimal notation, gnomonic projection and other conditions, two articles on the decrease of the indigenous races throughout the globe, and an obituary notice of Livingstone.

Bulletin for October.

M. DELESSE has contributed to this number a map of France designed to illustrate the agricultural productiveness of the country. It is based on statistics collected in 1852, pursuant to a decree of the National Assembly. These have been embodied cartographically on a map of the scale of 1:500,000, on which the produce of each *canton* was shown, and from this map M. Delesse has compiled the smaller map (scale 1:4,000,000) now before us. Of course there is no attempt to go into detail; the idea is simply to convey at a rough glance the proportion of revenue derived from arable land, vineyards, pasture and woods; different shades, varying from light to dark, serving to indicate the poorer or richer land, woods being coloured green, arable land brown, and so on. Viewed as one means of illustrating the resources of a country, this map is most valuable; in a great agricultural country like India, for instance, such an aid to our statesmen, could the statistics be readily and accurately got together, would prove of the greatest service. In the map now before us the antiquity of the data is certainly a drawback, but M. Delesse considers that the *proportion* holds true at the present time.

Other articles of note are a review by M. Harrisse, of the doubts cast by the author of a recent article in the *Bulletin*, on the authenticity of the *Life of Christopher Columbus*, purporting to have been written by his son; a review of M. Paul Gaffarel's work on the circumnavigation of Africa, as narrated by the Greek Eudoxus of Cyzicus, and two communications made to the Society, one on the subject of the sulphur mines of Louisiana, U.S., and the other from M. Gorelix, on his travels in the province of Rio Grande del Sud, in South America.

Bulletin for November.

THIS number opens with a notice of M. Dupuis's exploration of the Hong-kiang or Red River of Tong-kin.* He observes that for a vessel to reach Hanoi the chief port at all seasons, it is necessary that it should not draw more than 5 feet 10 inches. There are four mouths to the Hong-kiang, and until these are properly surveyed it will be exceedingly difficult to approach Hanoi. Beyond Hanoi, boats drawing as much as 6 feet 9 inches to 6 feet 10 inches can ascend as high as Yunan, but powerful engines are indispensable owing to the strength of the current. Hanoi is about 110 miles, and Yunan about 340 miles from the sea. This way of communication is a most promising one, and will prove of importance for purposes of trade, all the goods imported up the Yang-tse-kiang being equally adapted for the requirements of Yunnan, while among exports tin, copper, iron, and lead would play an important part, as well as tea, opium, and colouring and dyeing materials. M. Dupuis's idea is that in a few years the trade of the Red River ought to attain at least half the magnitude of that of the Yang-tse, as it would open up communication with the south-west provinces of China, with Laos and Tibet, the populations of which countries amount to an aggregate of about 50,000,000.

M. Dupuis contributes valuable topographical information regarding the chief towns of Tong-kin, and gives a detailed description of Hanoi, and its citadel, as well as an account of the seige of the town in November, 1873.

A translation of Captain Kostenko's paper on Khiva in 1873 finds place, as well as an interesting account of the three attemps which have been made by the Americans to obtain satisfactory soundings for laying a telegraph cable along a line from Yokohama to San Francisco. The soundings prove that the only chance of success is to keep close in to the Aleutian Islands,

* This river bears other names such as Hoti-kiang, Songka, or Song-koi, but M. Dupuis considers that the proper name is the Red River, a term derived from the reddish colour of its waters during the rains, which is occasioned by red mineral deposits in its upper course.

and even along this line further investigation is required before any definite conclusion can be formed. These soundings, however, have proved the existence of a cold counter current at a depth of 110 feet below the surface of the warm Japan current. A review of a French work on the United States of America concludes the number.

Bulletin for December, 1874.

M. DUVEYRIER contributes to this number a notice of European travellers and men of science who have died in Africa, illustrated by a map of the continent in which each place signalised by a death is marked with a cross, and a reference shows the name, nationality and date of the event. He states that ignorance of the climate and of the physical geography of the country has mainly contributed to excessive mortality in different expeditions, and points out that in Tuckey, Mungo Park, and Laird and Olfield's, the proportion of Europeans and natives that succumbed to fever and other ailments was positively enormous. The religious fanaticism of the Muhammadans has also helped to kill many. M. Duveyrier does not omit to point out that, although the use of quinine dates as far back as the 17th century, it was not till comparatively recently that the proper use of sulphate of quinine was understood, as Lander's medical instructions, on the occasion of his setting out for the Niger, were to use it only as a strengthening medicine *after* attacks of fever. M. Duveyrier's article will be found an exhaustive one, reaching down to last year. A perusal of it shows most strikingly how terribly costly has already proved the laying open to civilization of this huge and still so little known continent.

A description of the new hydrographical or catchment basin map of the department of Seine-et-Marne follows, as well as an explanatory memorandum detailing a new method of constructing relief maps by Mlle. Kleinhans, instructrix of geography in one of the French normal schools.

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90° 95° 100°

30° 25° 20° 15° 10°

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CHINA
BHUTAN
ASSAM
BENGAL
MUNIPUR
Naga
Khasia
Garo
Tipra
Kachar
Lushai Mts
Abor Miri
Mishmi Hills
Singkaling Patkoi Mts
Gulang Sigong Mts
Hukong
Kakhyen
Shue dung Gyi Ra
Khamti
Lissu
Yun ling
Yun chang
Momein
Bathang
Lithang
Tangyar dsung
Pomi
Lhasa
Lahu
Yamdok Cho, 13700
Dsela
Uketanacsa
Sangri
Jigugnagar
Chushuljong
Senghe
Laksole
Nai
Lobratunkang
Damjong
DaJong
Towang
Tezpur
Lakhimpur
Jaipur
Sibsagar
Dibrugarh
Sadiya
Dapha Bhum
Chusi
Dokela
Atentse
Yun ming fu
Lutse
Kien dsung
Seje ka
Yerkalo
Pemaka
Shillong
Cherapunji
Sylhet
Kachar
Decca
Comilla
Chittagong
Karnafuli
Noakhali
Hautung
Kulaung
Maharaow
Akyab
Talak
Kaven
Mreng Maung
Ramri
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Negrais
Ngawon
Irrawaddy
Preparis
Great Coco
North Andaman
Narcondam
Arakan Yoma
Poi
Sokte
Sangalklang
Mal selai Mon
Lushai Hills
Tipperah
Lushai Hauts
Bysari
Dallesur
Kado
Kaw
Padung
Kyun Nyat myo
Mogot
Manalong
Tagun
Bodwayn
Kaingma
Lawa
Thienni
Main ka
Thiso
Bauram
Unang
Lem
Mo
Pang
Mi Lang
Samtao
Tong
Mutse
Talikan
Isat
Hai tai
Sok
Pakla
Sokta
Nieng Hang
Phya
Fue Hla
Xiang Mai (Zimmé)
Laphon
Nau
Lagong
Phi
Sangkhalok
Siphirom
Phisanulok
Raheng
Kampheng
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Pegu
Martaban
Amherst
Moulmein
Tavoy
Mergui
Kuren
Red Karen
Yau
Yaw
Thaleng
Pagan
Pagoda
Sembyugun
Yenichun
Myeng
Mokmai
Enlai
Monhla
Nyengyan
Thayetmyo
Rawari
Lamu
Ramree
Kyaukpyu
Sandoway
Bassein
Pantanau
Yandun
Bhaing
Pauk
Sittang
Rangun
Martaban
Moulmein
Amherst

105° 110°

30° 25° 20° 15° 10°

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Shun king
Cooper
Ta tsien lu
Ta siu Shan
Tse chou
Kia ling
Yang
Tien chou Mts
Chung king
Wu long
Ping shan
Long shan
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Ying shan
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Pa mien shan
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Ping shan
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Ning yuen
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Su shan
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Tsun i
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Hwa y
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Loi
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Nam kan
Ubon
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Domdet
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Kompong Thom
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